DOCUMENT RESUME

ED 430 515 IR 019 485

TITLE	Mid-South Instructional Technology Conference Proceedings (2nd, Murfreesboro, Tennessee, April 6-8, 1997).
INSTITUTION	Middle Tennessee State Univ., Murfreesboro.; Southeast Missouri State Univ., Cape Girardeau.; American Association for Higher Education, Washington, DC.
PUB DATE	1997-04-00
NOTE	264p.; For selected individual papers, see IR 019 486-501.
AVAILABLE FROM	Web site: http://www.mtsu.edu/~itconf/proceed97/proceed97.html
PUB TYPE	Collected Works - Proceedings (021)
EDRS PRICE	MF01/PC11 Plus Postage.
DESCRIPTORS	Case Studies; College School Cooperation; *Computer Uses in Education; Distance Education; Educational Change; *Educational Technology; Elementary Secondary Education; Faculty Development; Higher Education; *Information Technology; Instructional Effectiveness; Interactive Television; Teacher Education; Teaching Methods; Telecommunications; World Wide Web
IDENTIFIERS	*Technology Based Instruction; Technology Utilization

ABSTRACT

Papers in this proceedings explore the theme of rethinking teaching and learning through technology. Along with general session papers that address asynchronous learning networks and the World Wide Web as a classroom without walls, the document contains papers in the following eight tracks: (1) Assessing the Effectiveness of Technology in Teaching and Learning, including evaluation of a notebook computing project, evaluation of three educational online delivery approaches, and return on instructional technology investment; (2) Distance Learning/ITV (Interactive Television), including training faculty to teach via two-way ITV, converting a desktop video conferencing system to classroom use, designing the computer-mediated conference, and hardware/software to support distance learning; (3) Faculty Development, including getting faculty and technology together, master classrooms at Middle Tennessee State University (MTSU), meeting faculty training needs in instructional technology, and MTSU's Digital Media Center; (4) Harnessing the Web for Instruction and Research, including creating a course homepage and practical tips/strategies for finding information on the Internet; (5) Instructional Technology Case Studies, including helping faculty create course Web pages, interactive television vs. a traditional classroom setting, best case practices of technology at Eastern New Mexico University, and the nature of teaching and learning in multimedia laboratory classrooms; (6) The Internet: An Electronic Course Delivery System, including enhancing learning through electronic communication technologies, a post-Gutenberg student research project, incorporating JavaScript in a Web-based multimedia development course, using electronic media to teach on-campus courses, and trailblazing/innovation; (7) Technology and Pedagogy, including critical thinking skills in a technology-related class, the virtual global village, the high-tech humanist, and DVI (Digital Video Interaction) in multimedia post-production techniques; and (8) University/K-12 Partnerships in Instructional Technology, including children's/young adult literature on the Internet, multimedia for middle level science teachers, a multimedia training program for K-12 teachers, and the University/Public

+++++ ED430515 Has Multi-page SFR---Level=1 +++++
School Keypals project. Papers from a workshop and several electronic demonstrations are also included. (DLS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 430 515

Rethinking Teaching and Learning through Technology
Mid-South Instructional Technology Conference
April 6-8, 1997

Middle Tennessee State University
Murfreesboro, Tennessee

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
L. Lea
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

IR019485

Proceedings of the 1997 Mid-South Instructional Technology Conference

Introduction

Introduction

Lucinda Lea, Director of Office of Information Technology at Middle Tennesee State University

Keynote Address

Asynchronous Learning Networks: At the Cutting Edge of Higher Education

Burks Oakley II, Professor, Department of Electrical and Computer Engineering and Associate Director, Sloan Center for Asynchronous Learning Environments, University of Illinois at Urbana-Champaign

Banquet Address

The Web: A Classroom Sans Walls

Alistair B. Fraser, Professor of Meteorology, Pennsylvania State University

Track Sessions

Track 1: Assessing the Effectiveness of Technology in Teaching and Learning

An Evaluation of a Notebook Computing Project as Part of the Total College Educational Experience

Phillip Heeler and Roger Van Holzen, Department of Computer Science and Information Systems, Northwest Missouri State University

Evaluation of Three Educational Online Delivery Approaches

Clark Edwards and Janie Harden Fritz, Department of Communication, Duquesne University

Return on Instructional Technology Investment: Getting the Bang for the Buck

Sylvia Bedwell Brace, Office of Information Technology, Middle Tennessee State University

---

Track 2: Distance Learning/ITV

A Systematic Approach to Training Faculty to Teach via a Two-Way Interactive Television System

Karen Jarrett Thoms, Learning Resources and Center for Information Media, St. Cloud State University

Converting a Desktop Video Conferencing System to Classroom Use

Liz Johnson, Division of Continuing Studies, Middle Tennessee State University

Designing the Computer-Mediated Conference: Improving a Conference's Productivity

H. Willis Means, Department of Elementary and Special Education, Middle Tennessee State University, and Terence C. Ahern, Department of Educational Psychology and Leadership, Texas Tech University

Hardware/Software to Support Distance Learning Classes

Bruce Harrison, Jr., Computer Center, University of Tennessee at Martin

---

Track 3: Faculty Development

Breaking the Vicious Circle: Getting Faculty and Technology Together

Glen Everett, Department of English, University of Tennessee at Martin

Master Classrooms at Middle Tennessee State University: Creating Pathways for Learning

Gina Roberts, Sylvia Bedwell Brace, and Donna Smith, Office of Information Technology, Middle Tennessee State University

Meeting Faculty Needs for Training in Instructional Technology: The Academic Technology Lab at ETSU

Delbert Hall, Center for Multimedia Development, East Tennessee State University

Middle Tennessee State University's Digital Media Center: Supporting the Development of Technology-Based Instruction

Gina Roberts, Office of Information Technology, Middle Tennessee State University

---

Track 4: Harnessing the Web for Instruction and Research

Creating a Course Homepage

Larry Summary, Center for Scholarship in Teaching and Learning, and Rebecca Summary, Department of Economics, Southeast Missouri State University

Guiding Students in Using the World Wide Web for Research

Kristin Kubly, Todd Library, Middle Tennessee State University

Practical Tips and Strategies for Finding Information on the Internet

Rhonda Armstrong and Lynn Flanagan, Todd Library, Middle Tennessee State University

---

Track 5: Instructional Technology Case Studies

A Strategy for Helping Faculty Create Course Web Pages

Fred Janzow and Larry Summary, Center for Scholarship in Teaching and Learning, Southeast Missouri State University

Interactive Television vs. a Traditional Classroom Setting: A Comparison of Student Math Achievement

Sherri Hodge-Hardin, Division of Developmental Studies, East Tennessee State University

Best Case Practices of Technology at Eastern New Mexico University

Calvin W. DeWitt, Department of Computer Information Systems, Scott Nutter, Department of Physics, Mary Ayala, Department of Modern Languages, and Debra Hall, Department of Extended Learning, Eastern New Mexico University

The Nature of Teaching and Learning in the Multimedia Laboratory Classroom: Process, Activity, Problem-Solving, and Engagement

Linda Best, Department of English, Kean College of New Jersey

---

Track 6: The Internet: An Electronic Course Delivery System

Enhancing Student Learning Through Electronic Communication Technologies

Janet Buzzard, Department of Computer Information Systems, Laura MacLeod, Department of Business Communications, and Calvin W. DeWitt, Department of Computer Information Systems, Eastern New Mexico University

A Post-Gutenberg Student Research Project

Suzanne J. Smith, Department of Business Administration, Presbyterian College

Incorporating JavaScript and Java Applets in a World Wide Web-Based Multimedia Development Course

Roger Von Holzen, Northwest Missouri State University

The Lecture Really IS Dead: Using Electronic Media to Teach On-Campus Courses

Robert D. Larison, College of Business, Eastern Oregon State College

Trailblazing Among the Traditionalists: The Joys and Perils of Innovation

E.W. Brody, Department of Journalism, The University of Memphis

---

Track 7: Technology and Pedagogy

Developing Critical Thinking Skills in a Technology-Related Class

Karen Thoms and Najimi Junaid, Center for Information Media, St. Cloud State University

The Virtual Global Village: The World Wide Web, Instructional Technology and the "Communicative" Classroom

Jon Blake, East Baptist Texas University

The High-Tech Humanist: Multimedia Computing in a Senior Applied Ethics Seminar

William J. McKinney, Department of Philosophy and Religion, Southeast Missouri State University

The Implication of Digital Video Interaction (DVI) in Multimedia Post-Production Techniques

Temba C. Bassoppo-Moyo, College of Education, University of Memphis

---

Track 8: University/K-12 Partnerships in Instructional Technology

An Online Adventure with BCReading and Wolftrip

Eric F. Luce, Department of Curriculum and Instruction, The University of Southern Mississippi

Children and Young Adult Literature on the Internet: An Introduction

Ruth T. Kinnersley, Educational Resources Center, Western Kentucky University

Computerized Collaboration: Multimedia for Middle Level Science Teachers

William J. McKinney, Department of Philosophy and Religion, Deborah Wooldridge, College of Education, and Rebecca Hines, Department of Secondary Education, Southeast Missouri State University

M.A.S.T.E.R. I.T. (Math and Science Teachers Enhancing Resources Through Instructional Technology): A Multimedia Training Program for K-12 Teachers

Constance R. Schmidt, Instructional Technology Support Center, and Nancy C. Keese, Department of Educational Leadership, Middle Tennessee State University

University/Public School Keypals Project: A Collaborative Effort for Electronic Literature Conversations

Betty D. Roe and Sandy H. Smith, Department of Curriculum and Instruction, Tennessee Technological University

---

Workshop

The Future of Teacher Education: Students, the Web, and the Teaching and Learning Process

Dorothy Valcarcel Craig, Department of Education Leadership, Middle Tennessee State University

---

Electronic Demonstrations

Macintosh Internet Server Implementation

Mike Baker, Carolyn Walsh Carter, Dennis Lutero, Jackie Meese, Suvit Nopachai, Maurya L. Schweizer, Jeff Stuart, and David Carter-Tod, Department of Teaching and Learning, Virginia Polytechnic Institution and State University

The Readers' Advisory in Academic Libraries

Virginia Vesper, Todd Library, Middle Tennessee State University

Teaching Precalculus with Scientific Workplace 2.5

Vlajko L. Kocic, Department of Mathematics, Xavier University of Louisiana

The Electronic Term Paper in the French Literature Class

Susan F. Spillman, Department of Languages, Xavier University of Louisiana

Using Web Pages as Supplementary Class Materials

David Starrett and Allen Gathman, Department of Biology, Southeast Missouri State University

Utilization of High Definition Audio to Create CD-ROM-Based Multimedia for Ear Training and Microphone Technique

Doug Mitchell, Department of Recording Management, Middle Tennessee State University

---

[Return to Mid-South Instructional Technology Conference Home Page]

Introduction

Lucinda Lea, 1997 Mid-South Instructional Technology Conference Co-Chair

---

In the midst of the first Mid-South Instructional Technology Conference a year ago, those of us involved in planning the conference found it such an exciting and rewarding experience that we began thinking about doing it again in 1997. Adding to the momentum for a second annual conference was the fact that the conference participants that first year found their experience a very positive and valuable one.

The 1997 Mid-South Instructional Technology Conference has proved equally exciting, providing an opportunity for many of the region's dedicated and innovative higher education professionals to come together and share ideas and expertise. Rethinking Teaching and Learning Through Technology, this year's conference theme, articulates our belief both in technology's role as a tool for education and in the basic reexamination of teaching and learning that this tool necessitates.

Middle Tennessee State University and Southeast Missouri State University are once again sponsoring the conference as a team effort, providing a stimulating environment for exploring new ideas and possibilities for teaching and learning. Our partnership was formed out of the American Association for Higher Education (AAHE) Teaching, Learning, and Technology Roundtable program. A conference highlight this year is a special workshop introducing Teaching, Learning, and Technology Roundtables that will be conducted by Steven Gilbert, director of technology projects at AAHE.

At the Mid-South Instructional Technology Conference, University, college, community college, and K-12 faculty, librarians, and administrators discuss and demonstrate the impact of emerging information technologies on the education process. Participants gain insight and share knowledge in more than 50 concurrent sessions offered in the eight tracks of Assessing the Effectiveness of Technology in Teaching and Learning, Distance Learning/ITV, Faculty Development, Harnessing the Web for Instruction and Research, Instructional Technology Case Studies, The Internet: An Electronic Course Delivery System, Technology and Pedagogy, and University/K-12 Partnerships in Instructional Technology. Also offered are interactive workshops, electronic demonstrations, and three featured speakers.

In the keynote address, Burks Oakley II, professor in the Department of Electrical and Computer Engineering and the associate director of the Sloan Center for Asynchronous Learning Environments at the University of Illinois at Urbana-Champaign (UIUC), discusses the program at UIUC in which networked computers are used to implement innovative teaching and learning environments, providing increased access to learning materials and to people. This new approach to teaching and learning has been termed Asynchronous Learning Networks (ALN).

In The Web: A Classroom Sans Walls, featured speaker Alistair B. Fraser, professor of meteorology at the Pennsylvania State University, discusses how the delivery of course material has changed forever as two roads--access and animation--converge. Fraser poses such questions as how the development of high-quality interactive resources available via avenues such as the World Wide Web will affect the evolution of the teaching profession and what the consequences of publishing pedagogical resources on the Web may be.
The plenary session conducted by AAHE's Steven Gilbert, Certificates, Chips, and Sweatshirts--Education, Technology, and Change, provides an overview of national trends and recommends strategies for using information technology more cost-effectively and thoughtfully to improve teaching and learning.

These proceedings give a comprehensive view of the excellent presentations of the 1997 Mid-South

Instructional Technology Conference. Dennis Holt, conference co-chair, and I thank all the attendees, presenters, and staff whose work, interest, and enthusiasm make this conference such a rewarding experience.

[TOP]

Asynchronous Learning Networks: At the Cutting Edge of Higher Education

5/23/97

Click here to start

Table of Contents

Asynchronous Learning Networks: At the Cutting Edge of Higher Education

Challenges to Learning

Challenges to Learning

Challenges to Learning

How to Address these Challenges?

Sloan Center at UIUC

SCALE – Revised Courses

What is an ALN course?

What software is used in an ALN course?

What is needed to get started with ALN?

Preliminary ALN Results

Improved Retention

Impact on Course Grades

Evaluation of ALN courses at UIUC - Fall '96

PPT Slide

PPT Slide

PPT Slide

PPT Slide

PPT Slide

PPT Slide

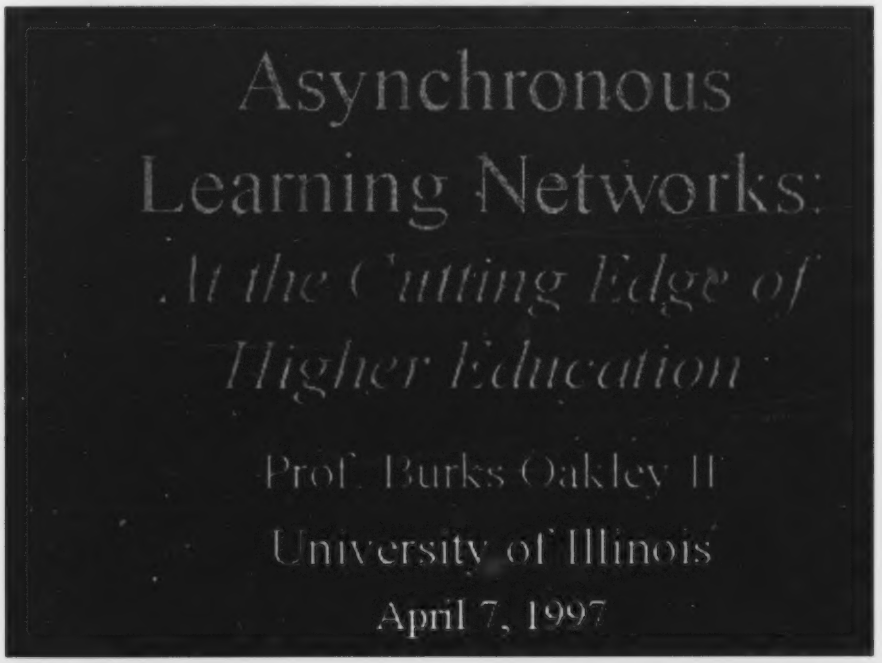
Implications for the Future

Author: Microsoft Corporation

Implications for the Future

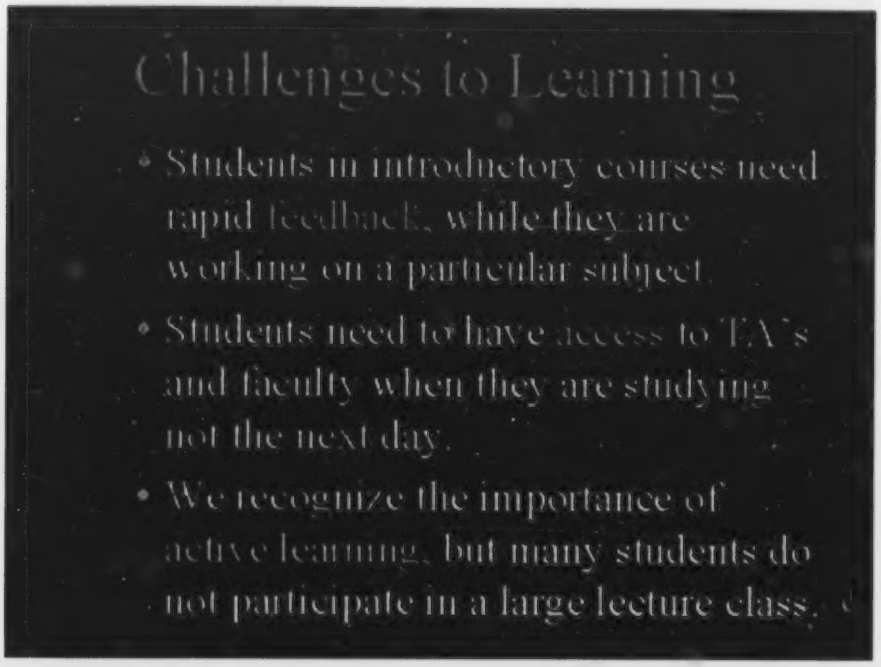
Implications for the Future

Asynchronous Learning Networks

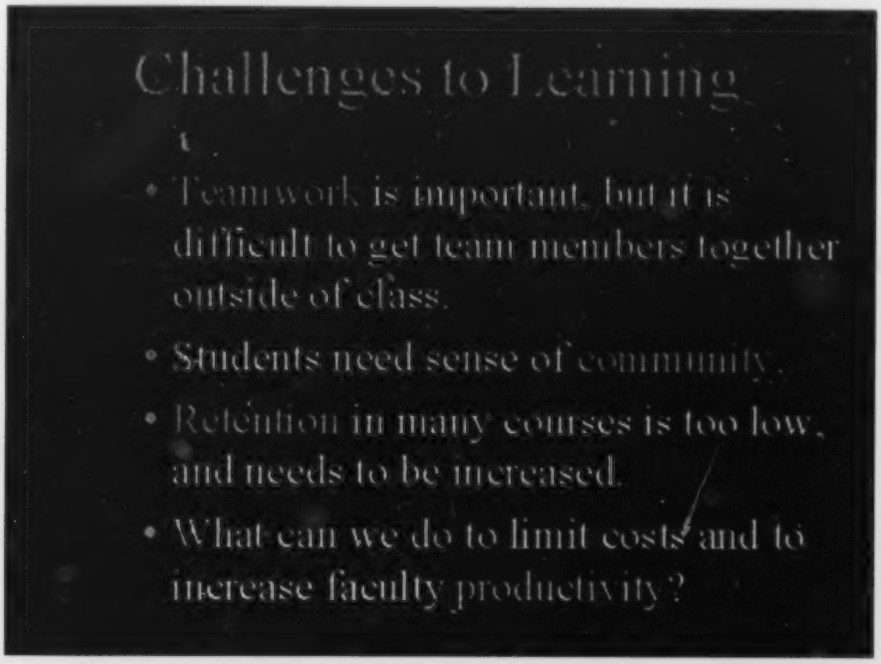


Slide 1 of 23

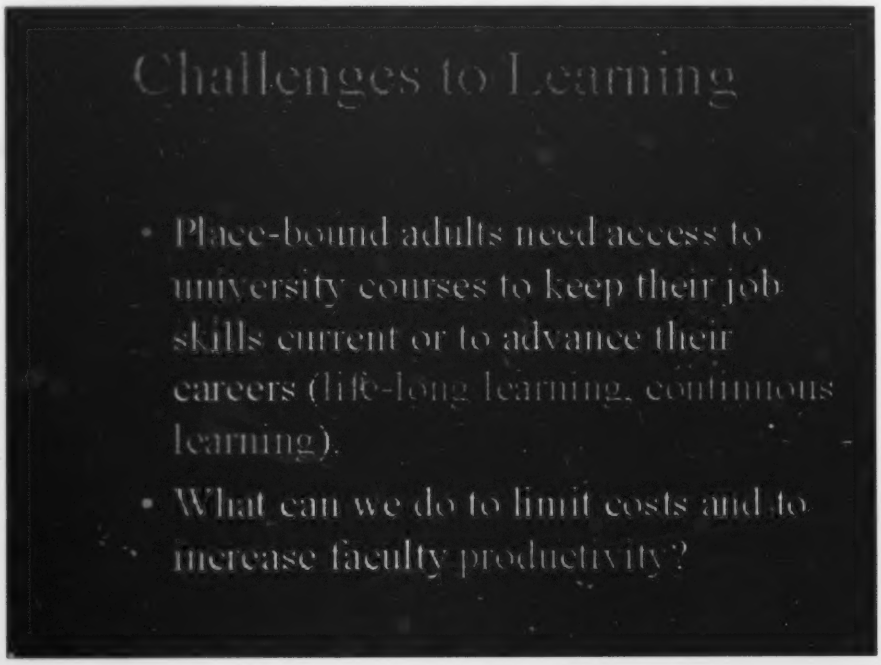
[Return to Mid-South Instructional Technology Conference 1997 Proceedings]


Challenges to Learning
• Students in introductory courses need rapid feedback, while they are working on a particular subject.
• Students need to have access to TA's and faculty when they are studying not the next day.
• We recognize the importance of active learning, but many students do not participate in a large lecture class.

Slide 2 of 23

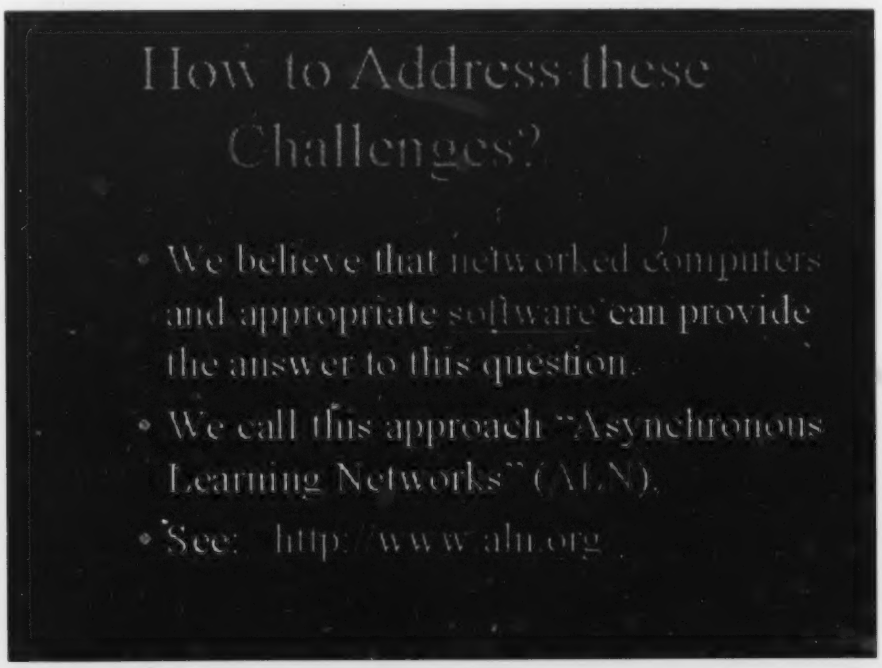

Challenges to Learning
• Teamwork is important, but it is difficult to get team members together outside of class.
• Students need sense of community.
• Retention in many courses is too low, and needs to be increased.
• What can we do to limit costs and to increase faculty productivity?

Slide 3 of 23


Challenges to Learning
• Place-bound adults need access to university courses to keep their job skills current or to advance their careers (life-long learning, continuous learning).
• What can we do to limit costs and to increase faculty productivity?

Slide 4 of 23

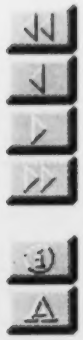
BEST COPY AVAILABLE


How to Address these Challenges?
• We believe that networked computers and appropriate software can provide the answer to this question.
• We call this approach "Asynchronous Learning Networks" (ALN).
• See: http://www.aln.org

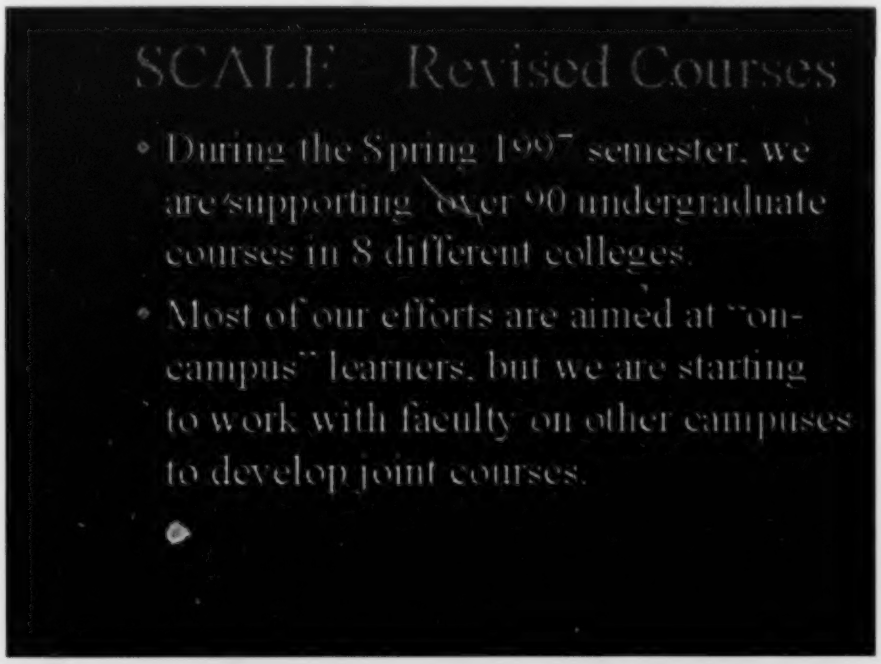
Slide 5 of 23

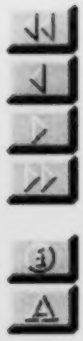
Sloan Center at UIUC

- We have received financial support from the Sloan Foundation and from Chancellor Aiken & Provost Faulkner to implement the Sloan Center for Asynchronous Learning Environments (SCALE).
- We now are integrating Asynchronous Learning Networks (ALN) into courses in many different curricula.

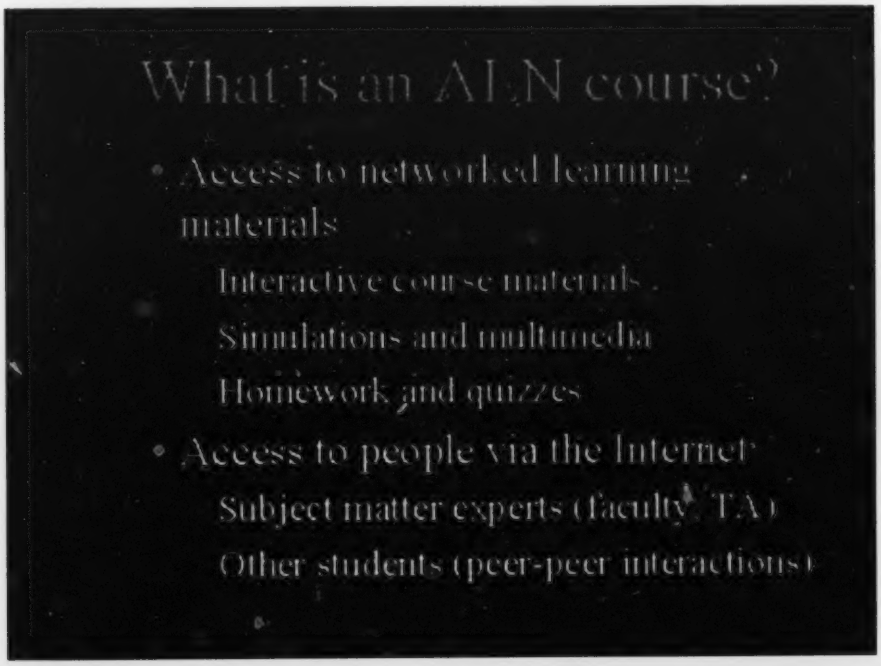


Slide 6 of 23

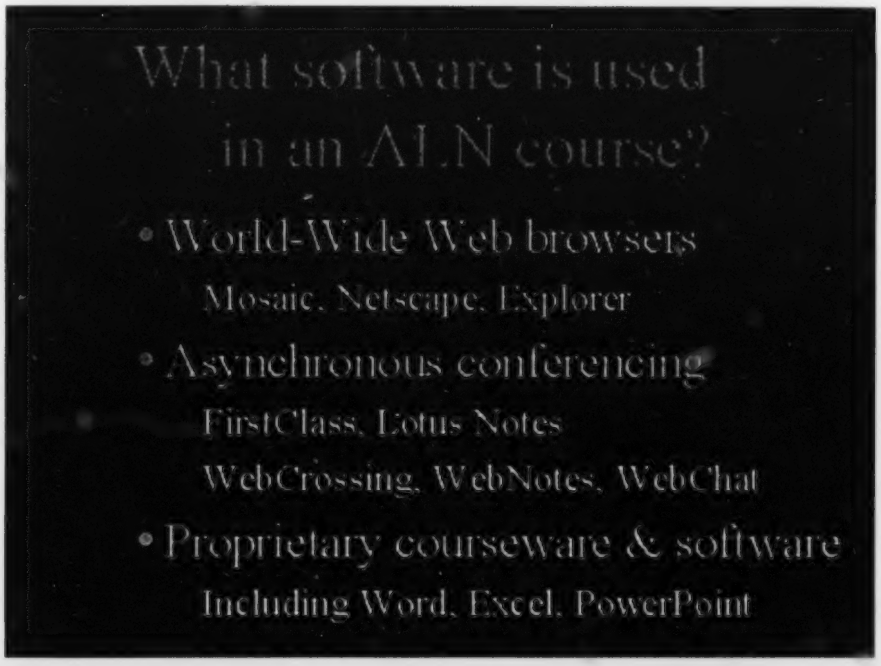

SCALE: Revised Courses
• During the Spring 1997 semester, we are supporting over 90 undergraduate courses in 8 different colleges.
• Most of our efforts are aimed at "on-campus" learners, but we are starting to work with faculty on other campuses to develop joint courses.



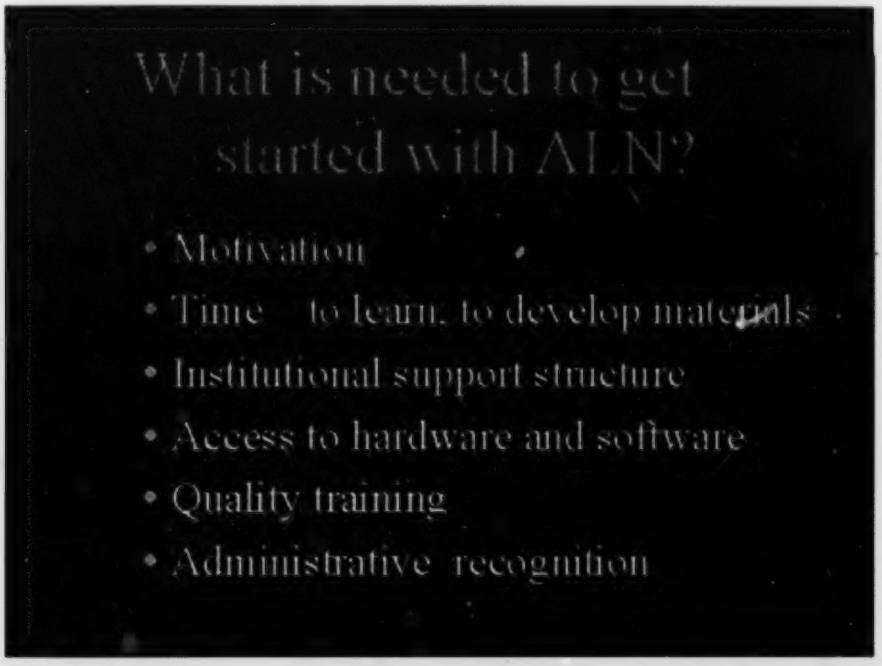
Slide 7 of 23


What is an ALN course?
• Access to networked learning materials
Interactive course materials
Simulations and multimedia
Homework and quizzes
• Access to people via the Internet
Subject matter experts (faculty, TA)
Other students (peer-peer interactions)

Slide 8 of 23


What software is used
in an ALN course?
• World-Wide Web browsers
Mosaic, Netscape, Explorer
• Asynchronous conferencing
FirstClass, Lotus Notes
WebCrossing, WebNotes, WebChat
• Proprietary courseware & software
Including Word, Excel, PowerPoint

Slide 9 of 23

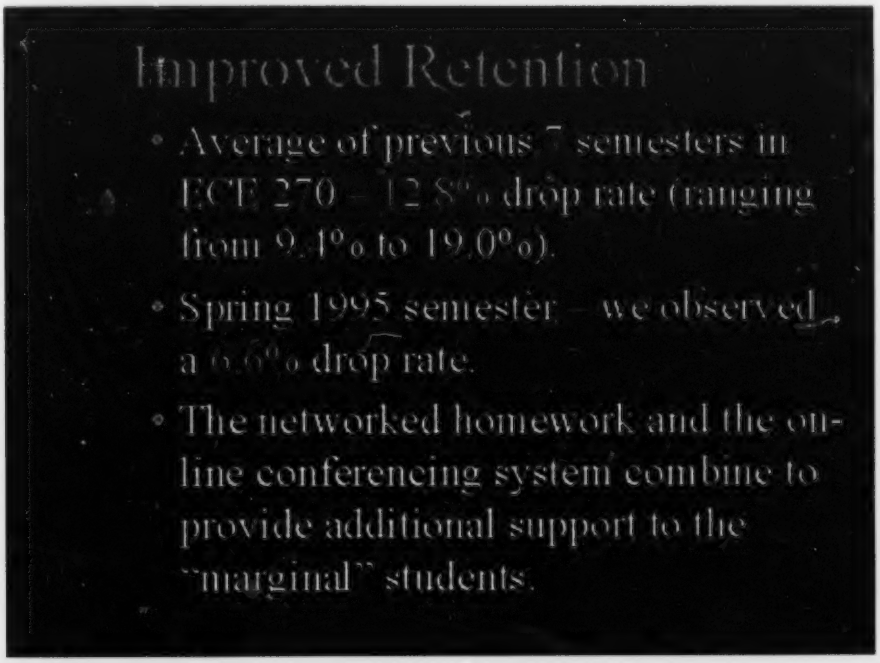

What is needed to get started with ALN?
• Motivation
• Time to learn, to develop materials
• Institutional support structure
• Access to hardware and software
• Quality training
• Administrative recognition

Slide 10 of 23

Preliminary ALN Results

- Increased retention – fewer drops.
- Improved test performance.
- Very positive student evaluations.
- More efficient use of faculty time increased "transaction density".
- Significant cost savings for the delivery of selected courses.

Slide 11 of 23


Improved Retention
• Average of previous 7 semesters in ECE 270 – 12.8% drop rate (ranging from 9.4% to 19.0%).
• Spring 1995 semester – we observed a 0.6% drop rate.
• The networked homework and the on-line conferencing system combine to provide additional support to the "marginal" students.

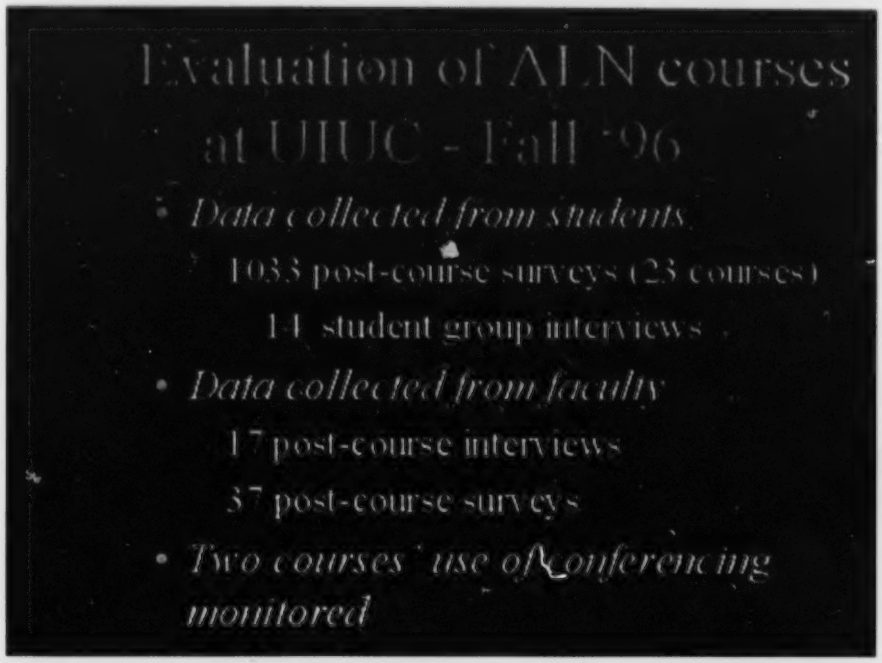
Slide 12 of 23

Impact on Course Grades

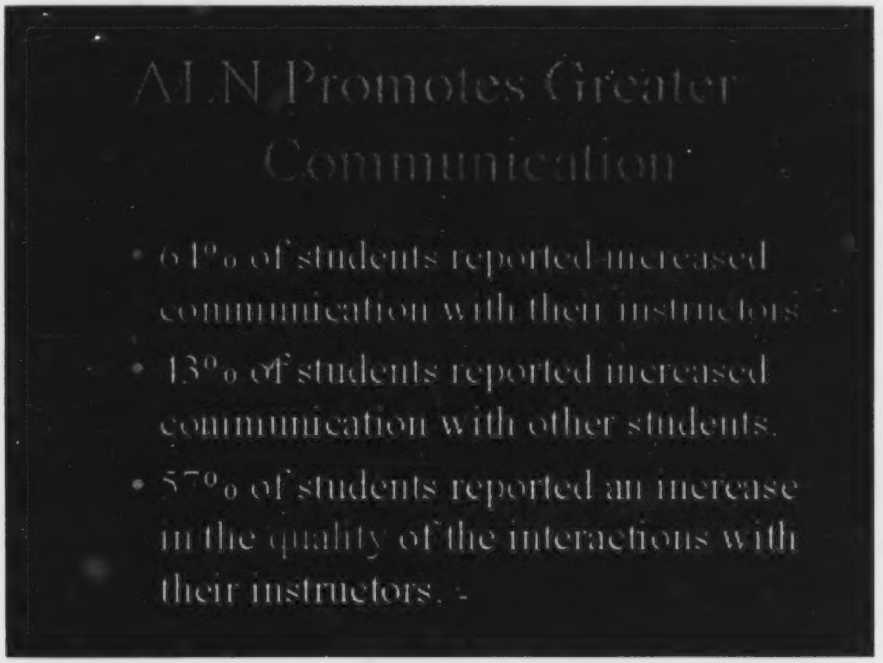
- ECE 270 - Fall 1994 - 2 "traditional" sections, 3 "computer-based" sections:

Course Grade	Traditional	Computer-Based
A	17.1%	38.1%
B	31.8%	26.0%
C	35.6%	21.5%
D	6.8%	6.6%
E	8.3%	7.7%

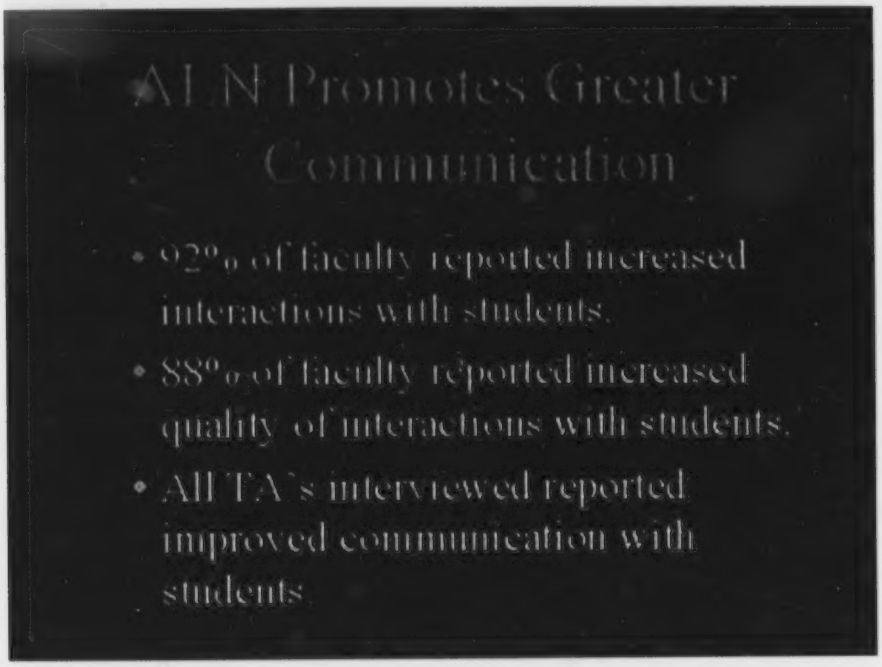
Slide 13 of 23


Evaluation of ALN courses at UIUC - Fall '96
• Data collected from students
1033 post-course surveys (23 courses)
14 student group interviews
• Data collected from faculty
17 post-course interviews
37 post-course surveys
• Two courses' use of conferencing monitored

Slide 14 of 23


ALN Promotes Greater Communication
• 61% of students reported increased communication with their instructors
• 13% of students reported increased communication with other students.
• 57% of students reported an increase in the quality of the interactions with their instructors.

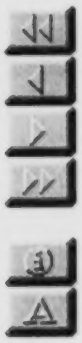
Slide 15 of 23


ALN Promotes Greater Communication
• 92% of faculty reported increased interactions with students.
• 88% of faculty reported increased quality of interactions with students.
• All TA's interviewed reported improved communication with students

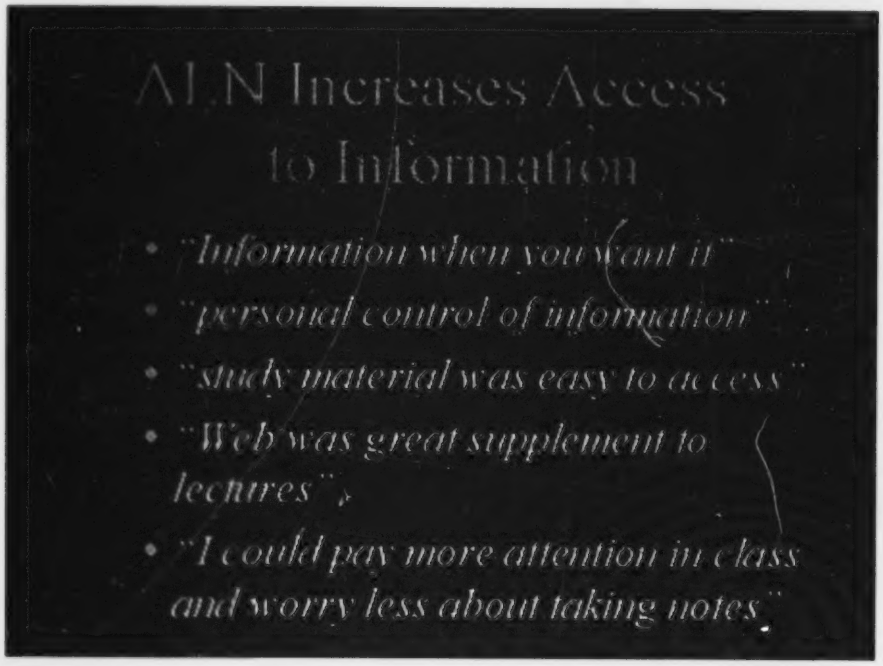
Slide 16 of 23

ALN Promotes Greater Communication

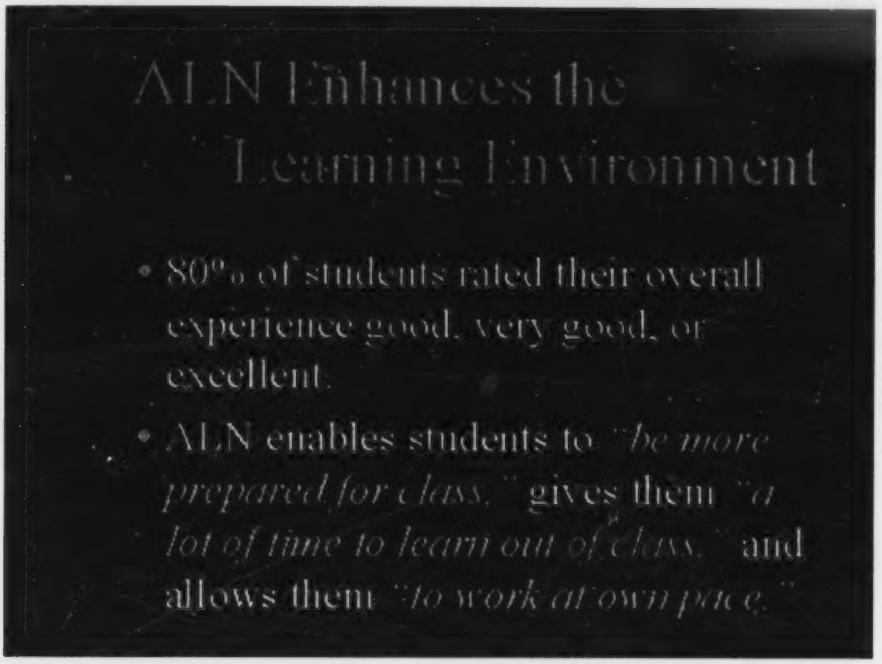
- Student: *"I learned much more than I ever had due to the high interaction between student-student and student-teacher."*
- Faculty: *"I believe the quality of my interactions with students was the highest I have ever experienced."*



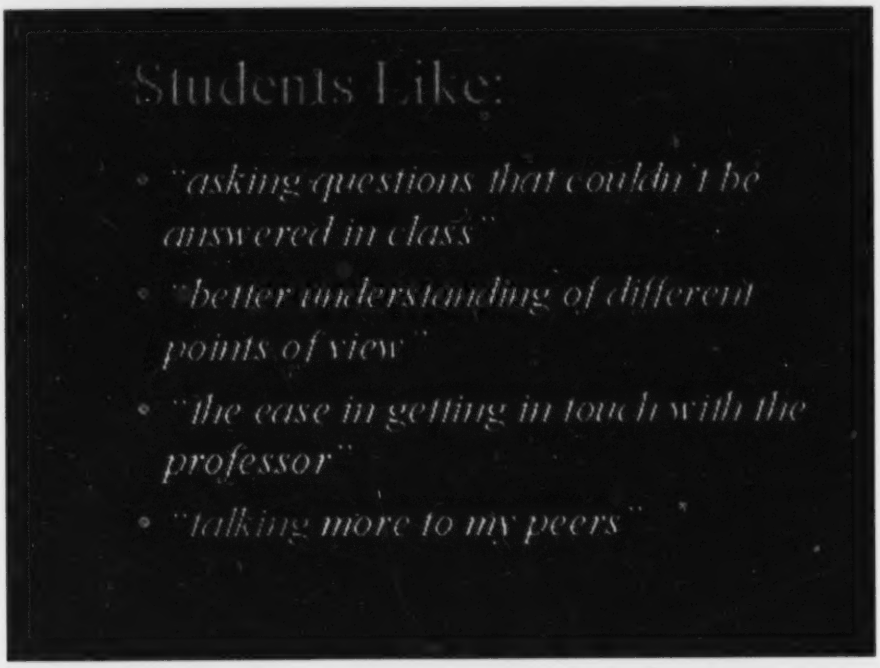
Slide 17 of 23


AI.N Increases Access to Information
• "Information when you want it"
• "personal control of information"
• "study material was easy to access"
• "Web was great supplement to lectures"
• "I could pay more attention in class and worry less about taking notes"

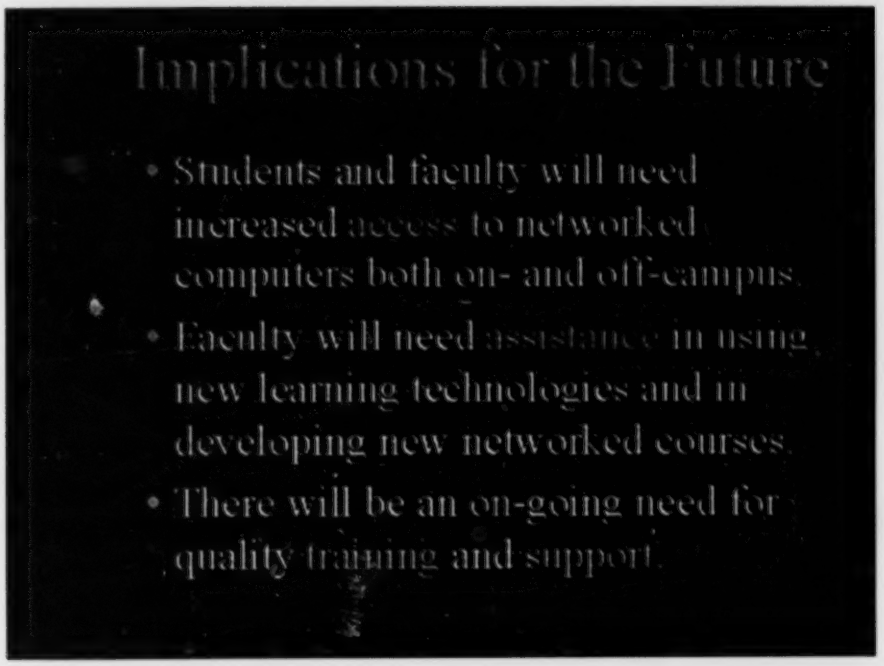
Slide 18 of 23


ALN Enhances the
Learning Environment
• 80% of students rated their overall experience good, very good, or excellent.
• ALN enables students to "be more prepared for class," gives them "a lot of time to learn out of class," and allows them "to work at own pace."

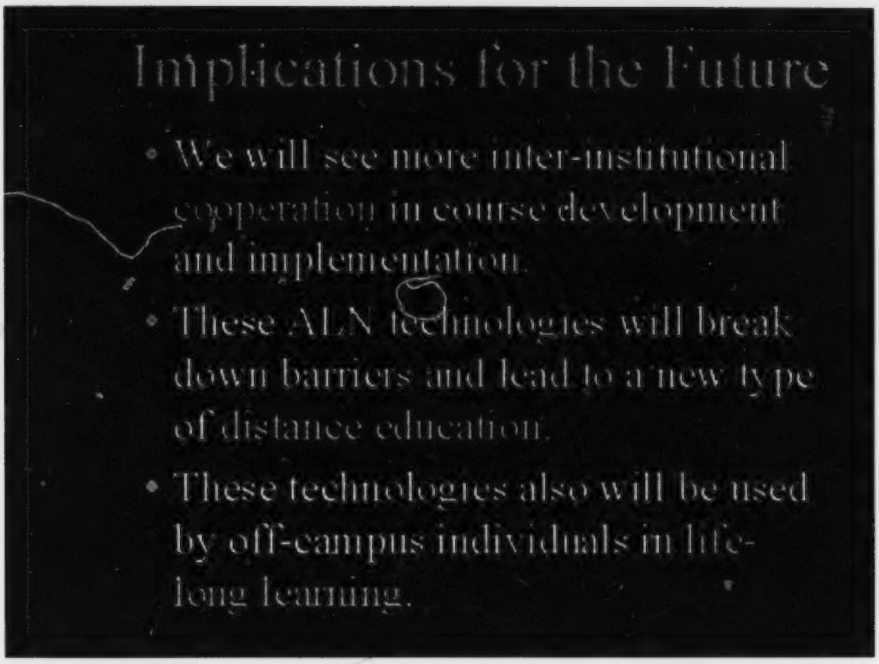
Slide 19 of 23


Students Like:
"asking questions that couldn't be answered in class"
"better understanding of different points of view"
"the ease in getting in touch with the professor"
"talking more to my peers"

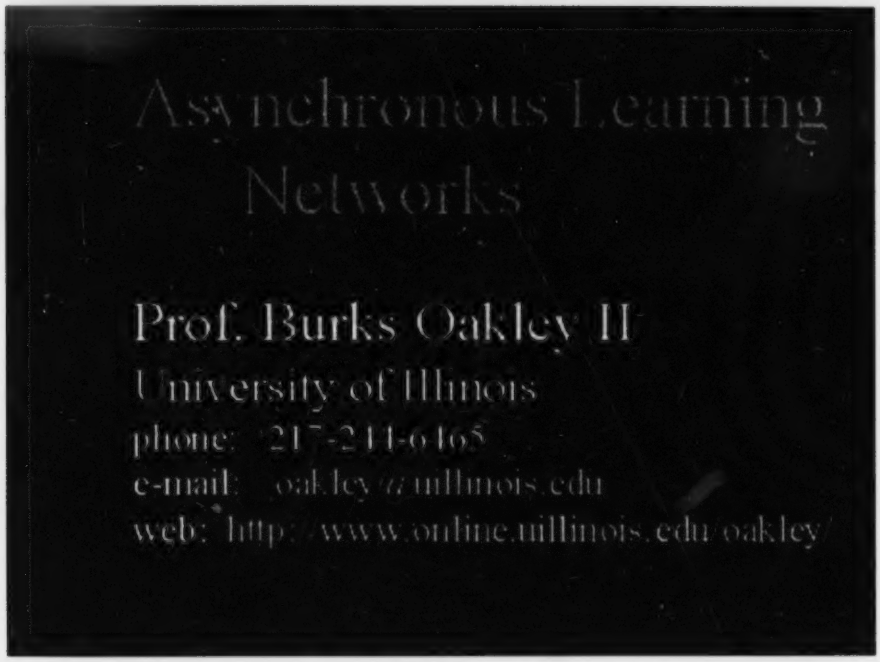
Slide 20 of 23

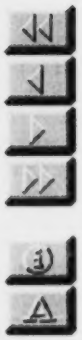

Implications for the Future
• Students and faculty will need increased access to networked computers both on- and off-campus.
• Faculty will need assistance in using new learning technologies and in developing new networked courses.
• There will be an on-going need for quality training and support.

Slide 21 of 23


Implications for the Future
• We will see more inter-institutional cooperation in course development and implementation.
• These ALN technologies will break down barriers and lead to a new type of distance education.
• These technologies also will be used by off-campus individuals in life-long learning.

Slide 22 of 23





Slide 23 of 23

The summary of a talk by

Alistair B. Fraser

Professor of Meteorology,
The Pennsylvania State University

The Web: a Classroom Sans Walls

The web of our life is of a mingled yarn
William Shakespeare
(1564-1616)

Abstract

The delivery of course material has changed forever as two roads converge: access and animation. Interactive resources can now be delivered into classrooms and dormitories across the world.

Background

In the middle ages and colonial North America, the classroom technology of choice was the scholar's board (which evolved into the horn book), a paddle-shaped piece of wood upon which a student inscribed a lesson being dictated. Like the modern computer, the scholar's board was interactive and would display text and images. Like the World Wide Web, its material could be transported from place to place. But it was slow --- infinitely slow by modern standards. Having a much better match with the human perception and processing system, the computer opens up many pedagogical advantages over not

BEST COPY AVAILABLE

only the scholar's board, but over its descendant, the blackboard, especially when the computer is used in conjunction with the web.

If the computer offers advantages over the pedagogical technology of previous generations, what are they? That there might be any at all is not entirely obvious to most participants in classes or seminars for which the presenter has --- as he might unfortunately put it --- computerized his lecture. Generally the presentation takes the form of bulleted text supplemented by a few gratuitous (and irrelevant) images and pointlessly cute transitions. The problem is that the material being presented has been cribbed from the yellow pads of paper previously used to assemble notes for the blackboard. Accordingly, the imagination that went into its preparation has been implicitly constrained by the presentation capabilities of the blackboard. Nowhere apparent is there any pedagogical value added as a result of the availability of the more powerful platform. Nowhere apparent is the realization that the constraints upon communication have receded.

For a couple of years now, the Web has been pressed into service to do exactly the same thing (but without the cute transitions). Indeed, there are many examples of course material available on the Web, but virtually all of them represent electronic transcriptions of that which was once offered in print. This use of the Web has certainly provided the material with broad accessibility, but it is not clear that the imaginations of most of those who prepared it have proceeded beyond designing for the yellow note pad, or possibly the hard-back textbook.

In fairness to the Web --- or at least to those who have developed pedagogical resources for it --- text and images were almost the limit of its capability up until 1996. Certainly cumbersome interactively was possible through cgi scripts earlier, but although welcomed, the pedagogical usefulness of it was small by comparison to that which the teacher could offer locally through proprietary software such as HyperCard, Toolbook, or Director.

But, 1996 has changed all that. With the advent of Netscape 2.0 (and subsequent versions) with its plugin technology, one could build interactive pedagogical animations to aid students in the visualization of concepts or processes, and these then become available not only in the classroom, but the dormitory room, and indeed, anywhere on the internet.

The fact that this is now possible certainly brings into sharper focus the question of why a teacher might wish to do build such resources for the Web. Let us break the question into two parts: the usefulness of the pedagogical resources; the consequences of publishing them on the Web.

Visualizations

An important aspect of teaching is that of smoothly slipping one's own mental constructs into the minds of students. The computer facilitates this in ways unimaginable in the past. Previously, one might have had a mental model of some process, but to communicate it to students, it would have had to be turned it into words, metaphors, equations, and a few line drawings. The students would then use these as building blocks in their attempts to reconstruct the original mental model within their own minds. These attempts were rarely better than partially successful.

Now one can create a computer visualization --- maybe in the form of an interactive animation --- which enables the mental model to be more smoothly slipped into the students' minds. A larger fraction of the class can now internalize the concepts successfully. This not only changes how one handles traditional topics, but even what topics one can present: concepts previously deemed too complex for a low-level course can now be understood when mediated by an effective visualization.

A succession of student surveys and final examinations provides systematic, if anecdotal, evidence that this approach does indeed increase the accessibility of concepts to students. It seems clear that, at least to

this biased observer, that an effort devoted to reinventing the way a concept is communicated now that the constraints of the blackboard have receded, brings benefits to one's students.

Access

Prior to the Web, a student in a class where computer visualizations were frequently offered was presented with a problem: how does one capture the material for later reflection and study. Note taking has its deficiencies; indeed, it was the very inadequacies of this sort of textual approach which had prompted the development of the new resources in the first place. Various approaches have been tried (collections of screen dumps available from the local copy house; copies of the software available in local laboratories) with modest success. But, they pale by comparison to platform-independent resources available over the Web to any classroom, dormitory room or home.

Now a student can explore the same materials used in class by the instructor and do so from virtually anywhere, at any time, and as often as needed. Again, to this biased observer, the advantages are palpable.

Making it work

An acknowledgment that the Web is now capable of delivering such material into the classroom and dormitory room, does not provide much insight into how to go about developing it. Indeed, as anyone who has seen a Web browser used as if it were satisfactory presentation software (instead of what it is, a way to browse the internet), will acknowledge, there is work to be done before it can be effectively employed directly in the classroom.

The mechanism by which one turns a Web browser into a effective means of presenting a whole course's worth of material in a classroom is fairly involved. Suffice to say here that the approach adopted involved building a special classroom interface. When the course is entered, the standard browser controls vanish and a new set (created using frames and JavaScript) appear. These provide easy access from any screen to features such as the hierarchical structure of the course, the default forward and reverse path, history, help screens, a glossary, and standard supporting resources of use in both the classroom and dormitory.

Equally important is the establishment of a convention for the navigation and exploration of resources such that it will be obvious after a couple of minutes of orientation how to find and understand material from anywhere in the course. This has been done by adopting a convention which specifies the order in which buttons of various shapes and locations should be explored.

In practice, then, the instructor stands by a large projection screen at the front of the class and remotely controls the computer from which material is projected (see the picture above). The instructor proceeds as in any normal class --- by lecturing, promoting discussion, posing questions, even cajoling, and generally interacting with the students --- but he or she also has a powerful suite of resources to help present and promote the understanding of the material. And, outside the classroom, the students can continue to interact with the same resources.

Curious implications

Let us imagine that a whole course has now been developed and deposited on a Web server. It contains text, graphics, photographs, video clips, self-running animations, interactive animations and pedagogical models the parameters for which can be chosen by the user --- in short, everything the instructor would want to supplement and elaborate on every topic in the course. The instructor uses the material to facilitate explanations in class; the students use the material outside of class to not only review, but make further explorations of the concepts.

Such is the case for an introductory course in meteorology I teach. But if all of resources are available to the instructor and his students, they are also available to any other instructor and student on the internet. Indeed, this was one of the design criteria: from the same server, the course is offered on both the main campus of Penn State University and one of its many branch campuses. In this way we can offer courses on our branch campuses for which the numbers would have not previously justified it.

But, if the material can be used on one of our branch campuses, it can be used anywhere in the world (assuming that we do not limit its accessibility by domain, which we have no plans to do).

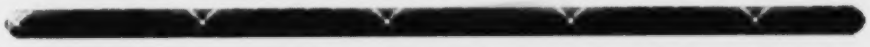
There are presently six hundred institutions of higher education in the U.S.A. which teach a vaguely comparable introductory meteorology course. Eighty percent of those courses are taught by non meteorologists. Would a handful of those instructors find it useful to have all the resources needed to deliver their course available through their university's backbone. It is at least conceivable that some would. Then, what about all those Earth Science courses in high schools, and this ignores all of the rest of the world.

Now imagine, as will happen, that every discipline creates such resources at all levels and makes them available to the world. How will courses be offered. Will a student sitting at home, but titularly enrolled in a college in one state find herself taking an English course which has its resources brought in from Harvard, a chemistry course from Princeton and a meteorology course from Penn State University? And if so, the question of the function of the local instructor will be brought into much sharp focus. Over the next decade as high quality interactive resources are delivered into classrooms and dormitories across the world, we can expect that our profession as teachers will evolve more than it did over the previous century.

But, if the role of teachers will evolve, one might expect the role of universities to evolve even further. At present, most universities operate in much the same way as did the computer firms of more than a decade ago: they attempt to offer the total solution. Just as a computer company used to try to trap a customer into buying everything from itself --- basic machine, peripherals, operating system, software, maintenance contract --- universities now provide students with virtually all of their classes, their books, board, room and then toss in a social life. The computer industry was forced to go to an open structure with boards, peripherals, and software being offered as plugins from a wide variety of suppliers. Will, the universities be able to make the transition to an open structure in which many of the undergraduate credits arrive from a dozen or so different off-campus sites? (Some of these sources may well be from businesses set up to provide such resources, rather than from other universities). With the potential for a student at one location ---home, say --- to take courses from many other locations and taught by professors at even other locations, what will be the function of the undergraduate institution, itself? When the physical plant ceases to be the gathering place for students or teachers, will a university's survival turn on its role as an agent of certification? Alas, even the power to award degrees is a power bestowed from elsewhere in the society, so it too might pass. Look for tumult in the ranks of undergraduate institutions over the next decade or so.

Coda

Following the ideas laid out in this essay, course resources entitled, Introductory Meteorology, are being built. You are welcome to explore them, but bear two things in mind: there are fairly stiff technical requirements for entrance (discussed on the set-up page); not all of the material is in place as yet.



Click on the Fraser Clan Crest Badge to go to the home page of Alistair B. Fraser.

abf1@psu.edu

An Evaluation of a Notebook Computing Project as part of the Total College Educational Experience

Phillip Heeler, Ph.D.

Roger Van Holzen, Ph.D.

- Abstract
- Notebook Computer Pilot Project for 1995-96
- Notebook Computer Project for 1996-97
- Assessment of the Pilot Project
- Importance Contribution
- Conclusion

Abstract

Northwest Missouri State University became known as the Electronic Campus when, in 1987, it was the first public regional university to install computer terminals in every student residence hall room and faculty office. In fall 1995, a pilot program was initiated to incorporate the latest computer innovations into the original Electronic Campus and network. This session describes ramifications of this project including the impact on student and faculty computing and the university's curriculum, infrastructure, and support systems. Recommendations will also be made for integrating notebook computing into the total college educational experience.

Notebook Computer Pilot Project for 1995-96

The purpose of the notebook computer pilot project was to provide access to, mobility with, and integration of computer-based-technology across all aspects of the students' educational experience. Ninety-five entering freshman students chose to participate in the pilot project and paid $395 per semester for the use of a notebook computer. Besides having access to a high capacity computer network in their residence hall rooms, students utilized the notebook computers while attending targeted classes in two state-of-the-art classrooms.

Students enrolled in specially designated general education courses such as computer literacy, composition, mathematics, history, geography, speech, wellness, and physical science. The fifteen faculty members who agreed to participate in the pilot project were each given a notebook computer, a stipend, and sixteen hours of training on using the Microsoft Office software and use of the Internet in academic applications. They were expected to teach their pilot project courses using the notebook computer and also incorporate innovative educational activities into the sections of their courses that used the notebook computers.

At the end of the first year of this pilot project, several points were realized by the participating students, faculty, administration and Computing Services staff. The pilot project students used the notebook computers in their classes, in their residence hall rooms, and while studying. They became very accustomed to carrying their notebook computers all over campus. In some of their courses they were expected to use the computers in every class. In other courses the use was sporadic and minimal. This

wide difference in use proved to be a controversial point between the students, the teachers, and the administration.

The pilot project faculty members were also very conscientious in their attempts at incorporating this new technology into their courses. This new information tool allowed the faculty to take their computers with them everywhere they went including their offices, classrooms, and off campus. With this adjustment in accessibility, some faculty members were able to create new teaching materials that used the power of the notebook computers in their classes. Also, some of the faculty members now expected the students to use the notebook computers outside class because of the increased accessibility. This new-found computer power, accessibility, and mobility required the faculty members to modify some of their teaching and testing techniques.

The Northwest administration found this pilot project to contain several positive and negative features. First, the increased accessibility of computing power to the ninety-five participating students forced the Computing Services office to change their traditional routines for maintenance, assistance, and delivery of services. Second, the students quickly swamped the campus network with data traffic that exceeded the traditional text-based data traffic. Third, the problems of hardware and software maintenance, repair, networking and connectivity all forced constant adjustments in policies and procedures. Fourth, the administration found the evaluation and assessment of the pilot project to be very difficult as all groups attempted to adjust to this new instructional tool.

Notebook Computer Project for 1996-97

Northwest is now in the second year of the notebook computer project. Considering the experience gained during the first year of the pilot project, several planning decisions were made in an attempt to improve upon the results of the pilot project. The following is a list of actions that were taken by the pilot project steering committee in preparation for the second year.

* Increased state funding was obtained to enhance the infrastructure necessary to support a more complex and larger capacity campus computer network.
* Along with the installation of the enhanced network, more sophisticated software was installed, and more sophisticated maintenance measures were required to operate the new network.
* The pilot project faculty and student participants quickly learned that notebook computers require careful maintenance. This obligation put a larger strain on Computer Services to maintain the hardware and software. In turn, more rigorous specifications were designed for the notebook hardware and software that were to be purchased by the students in the second year of the program.
* After the successful preparation of the pilot project faculty, a second group of faculty had to be selected and prepared for teaching notebook designated courses.
* The necessary training and mentoring of the faculty became a much larger task not only because of the increased numbers but also because of the sophistication requirements from both the faculty and the students. In response to this need, a faculty mentor position was created, additional technical support personnel were hired, and student assistants (pilot project students) were hired to assist faculty as they developed materials for their courses.
* The selection of students who would be interested in participating in the notebook computer project needed to be completed on a more timely basis with a more rigorous approach to recruitment. One significant difference from the pilot project was that students were expected to buy a notebook computer instead of renting one.
* In order to be able to teach more notebook courses in more classrooms on campus, the selection, design, and renovation of six classrooms had to be scheduled and completed.
* The scheduling of more notebook courses and the registration of students in these courses required the joint efforts of the faculty, registrar, and advisors.
* The results of the pilot project assessment indicated that the students, faculty, and associated support personnel approved of the project and supported the premise of the project.

Assessment of the Pilot Project

The ninety-five pilot project students participated in two specific assessment activities during the 1995-96 academic year. Late in the fall semester, ten different focus groups were held for the purpose of listening to, asking questions about, and eliciting evaluative comments from the pilot project participants including students, faculty and support personnel. The comments made by the students included recommendations about

* course content
* faculty preparation
* student work load
* equipment reliability
* equipment flexibility
* the quality of computer support

The comments made by the faculty participants included recommendations about

* faculty preparation
* faculty expectations
* student expectations
* equipment reliability
* equipment capabilities

The comments made by the computer support personnel included recommendations about

* computer reliability
* computer repair rates
* vendor reliability
* software reliability
* student and faculty expectations
* heavy workload to support 100 notebook computers

At the end of the spring semester, when the pilot project students were required to check in their notebook computers before leaving for the summer, another assessment instrument was used to gather additional information about the student pilot project participants. This survey asked several questions. Some of the questions are listed below.

1. Have you benefited from participating in the EC+ pilot project?
2. How could the EC+ pilot project have been better for you?
3. Indicate the extent to which you agree with the following statements:
   * Using a notebook computer has helped you meet your goals.
   * If starting over you would choose to participate in EC+ again.
   * You would recommend EC+ to others.
   * EC+ has helped motivate you to improve your academic life.
   * EC+ welcomes and uses feedback from students for improvement.
4. Rate the IMPORTANCE and your impression of the CONTRIBUTION of the EC+ pilot project toward your progress in reaching these items.

After tabulating each of the assessment measures, the results from the notebook pilot project were moderately positive. These results were scored using a scale with 1 as negative, to 5 as positive. The importance of the above factors varied from 3.77 to 4.26 as listed below. The contribution of the EC+ pilot program varied from 3.09 to 3.97. Both categories indicate to a moderate degree the importance of the EC+ pilot project and the contribution of the EC+ pilot project.

IMPORTANCE CONTRIBUTION

4.14 Learning to think and reason. 3.41
4.09 Improving your writing skills. 3.78
3.77 Further developing your study skills. 3.11
4.23 Developing openness to new ideas and practices. 3.97
4.08 Broadening your intellectual interests. 3.89
3.85 Learning about career options. 3.09
4.03 Understanding yourself- your abilities, interests, and personality. 3.42
3.94 Ability to put ideas together, to see relationships, similarities, and differences between ideas. 3.53

4.26 Becoming academically competent. 3.72
3.89 Setting long-term goals. 3.27

At the beginning of the 1996-97 academic year the notebook computer initiative expanded to include approximately 350 students and about 30 faculty members teaching typical general education courses. Most of the students are first year with a small number being upper class students. All of the first year students were directed to enroll a computer literacy course. This course consists of 27 sections and has a total enrollment of 810 students. In each of the 27 sections, a small number of students who have notebook computers were allowed to enroll. This number was combined with the remaining students to total about 30 students in each section. With this population of students some of whom use their own notebook computers and some of whom use desktop computers provided in the classroom, another assessment inventory was conducted.

A general attitude inventory was given to each student enrolled in the course and a series of 25 computer literacy knowledge questions was given. At the end of the computer literacy course another assessment will be given to the students to determine if there is any difference between the notebook students and the regular computer literacy students who were forced to use the desktop computers in this course.

Conclusion

This paper provided a detailed description of the first year of the notebook computer project and the decisions made based upon the assessment results from the pilot project. Now that the project is into its second year, different difficulties are being resolved and additional expectations are being realized. In order to integrate notebook computing into the total college educational experience, Northwest Missouri State University must continue to enhance the computing infrastructure and the faculty must continue to restructure their courses. Students have shown that they will choose courses that are taught using technology if the technology is used appropriately. To this end the Northwest notebook computing project continues to evolve.

[Top]

Evaluation of Three Educational Online Delivery Approaches

Clark Edwards, Ph.D.

Janie Harden Fritz, Ph.D.

- Abstract
- Introduction
- Alternative Delivery Styles
- Methodology
- Graphic Design and Visual Communication: Description and Comparison
- Discussion
- Conclusions
- Notes
- Appendix A

Abstract
Overall, students perceived strong learning outcomes from online materials and from mediated modes of education overall. For all classes, mediated forms of educational delivery were well above scale item midpoints. Online learning, furthermore, is perceived to be enjoyable, interesting, and productive of desirable pedagogical outcomes such as concept learning and application. From the comparison of theoretical and applied classes, one observes that online formats are likely to be helpful for both kinds of learning tasks.

Introduction
A discussion of the potential of alternative education delivery technologies usually ends with the question: "Is learning as effective when delivered via alternative media as opposed to that which happens in the face-to-face classroom environment?" This is a reasonable question, given the costs associated with production of much media-based learning materials and technologies. The operative word in that question is"effective," and more accurately refers to the effectiveness of "learning" rather than "teaching." As Illich opined in the 1960s, that with technological resources education could become learning rather than teaching. The "resources" Illich wrote of in the 1960s is very much like what the Internet has become and is becoming in higher education. The Internet, as Sangster (1996) has noted, is about learning not teaching. "Learning how to learn is all about being able to adapt...being able to take past experiences and use them in the future, both in and out of the original context, being able to take a skill and alter or adjust it to work in a different context, and being able to learn new things when required." In 1983, Richard Clark reviewed the research to that date on media-delivered education and disturbed many with his conclusion that "media are mere vehicles that deliver instruction, but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (Clark, 1983).

The fundamental questions regarding the learning "effect" seem little resolved after a decade. However, what is becoming more clear is the mediation process places greater responsibility on the "learner" side of the equation. On one side of the debate are those who contend that each medium has a unique set of characteristics that differentially support different types of learning activities, goals and outcomes. Supporters of this view argue that "understanding the ways in which students use the unique processing capabilities of the computer [or other media] is essential to understanding the influence the computer may have on learning and to building media theory" (Kozma, 1994). The students' perceptions about the use of three styles of mediated delivery is a significant focus of this study.

Clark, on the other side of the debate, continues to argue that "media will never influence learning" (Clark, 1994) and that differences in instructional design and learning activities, applicable to almost any medium, are the causes of differential learning outcomes under different media treatments. At the root of the debate is the complexity of the learning process itself. Certainly, one facet of this view must include the students' self-evaluation of the learning process. In fact, if a student believes they have learned, that should be the starting point for all evaluative processes in measuring learning.

In some contexts, learning means acquiring a set of conceptual facts and ideas that can be quickly recalled during formal examinations. In others, learning includes the ability to integrate new knowledge critically or creatively into unique contexts. Some educators include affective responses such as "appreciation and enjoyment" in a full definition of learning.

Some argue that learning has not occurred at all unless it can be demonstrated behaviorally. O'Donnell suggests that in addition to the problem of definition, there's another facet to consider:
Every revolution in communication has both added to the power and range of what is communicated, and taken away some of the intimacy. Writing began the long, slow disestablishment of the face-to-face community of people who all knew each other, and every communication technique introduced since then has furthered that
process.(O'Donnell, 1995)

Despite the intricacies of the debate, research over the past 70 years has generally concluded that there are no significant differences between learning delivered face-to-face and that delivered by alternative media. This generalized result is used by media proponents to argue for the advantage of media delivery, since no direct human intervention is involved in the learning outcomes. Traditional delivery proponents have argued that since no learning improvements were noted, there is no compelling reason to change from time-proven (face-to-face) delivery methods.
In this study, thee distinct approaches have been taken which embody three levels of the traditional approach and three differing levels of the mediated delivery approach. These approaches were taken with given that research to date has not shown complete support for either approach alone. Therefore, a reasonable optimum must be somewhere in the "middle" or somewhere in combination of the new and the traditional approach. In fact, this initial research suggests that it's not a question of "either / or" with regard to the use of mediated materials versus traditional human intervention, rather the consideration is how much of which facilitates the best learning situation.
O'Donnell, an experienced user of teaching technologies, argues for the integration of technology even while educators strive to determine what "teaching" method or methods are better.

"My experience these last years has been that the new technologies of networked information are indeed liberating, to real teachers and real students. It's not as though we couldn't use some help. There are plenty of frustrations for teachers, plenty of obstacles yet to surmount, plenty of barriers separating us from the students we want to reach. The best way to view information technology is to let it address the problems we already know we have (O'Donnell, 1995)."

The technology of communication, however, is far from neutral, and as McLuhan points out, is loaded on the "learning" side of the equation: "When technology extends our senses a new translation of culture occurs as swiftly as the new technology is interiorized (McLuhan, 1962)." Addressing the specifics of the Internet, Teilhard de Chardin went further to predict that a web of communication technology would first grow up beside, then surround and finally would be organically assimilated into human consciousness (de Chardin, 1973). With the extraordinary development of the Internet in higher education, the futures predicted would seem upon the collective academy now, and, the question of "how" best to implement the learning experience the most pressing.

Alternative delivery styles
Research to date suggests that quality learning can be delivered in many ways, by many media, including face-to-face delivery. Given this rough-equivalency of outcome, we can legitimately move to questions of cost-effectiveness and access. Face-to-face delivery is expensive and cannot scale itself up to meet ever increasing demand. Higher education in the United States has increased in cost over the past 25 years at rates 3-5 percent above those of inflation (Gillford, 1994). Universities are challenged by the demand fueled by larger percentages of high school graduates attending university, the need for life-long learning and retraining, and the increase in technological skill levels demanded by information-age employment.

The most compelling argument for the alternative delivery of university programming comes from the consumers themselves -- the new students of the 21st Century. Students, as consumers, are demanding and are willing to pay for education and learning experiences which can be delivered at the time and place where that learning is most relevant and convenient. It is easy to imagine this type of learning in content areas such as engineering where knowledge of emerging technologies can have direct job application. But there are also opportunities for philosophers, historians and others in the humanities and social services where events such as personal crisis, changing vocations, or personal interest create the need for a learned response.

The response to the challenge of alternative media delivery systems must be a willingness and desire to explore many new options. There is little to guide educators as to the better methods to employ to produce the greatest pedagogical support. In a 1966 study of 660 institutions, only 43% had a strategic plan in place to cope with the goals, objectives or implementation for the role of information technology in higher education (Green, 1996). Green also noted that the national survey of college campuses revealed that "More than a decade into what some have called the 'computer revolution' in higher education, it is very clear that most campuses are still operating without a strategic or financial plan to implement information technology (Green, 1996)." Without knowing how to implement the technology into the learning process, it is quite difficult to decide how to allocate or reallocate what resources.

Oxford's Alex Reid points out that we haven't progressed much in the delivery of good learning materials. "After 30 years of courseware development, we still have very few examples that we can point to as models for future development. ...Without ample examples of good practice in every discipline, we will not progress (Reid, 1994)." As this study suggests, it is more than the courseware materials, good models may intensely involve the delivery system access, styles and methods as a significant part of the mix for developing good examples to build upon.

Methodology
In order to assess students' perceptions of outcomes of various educational media formats, an exploratory investigation was conducted in the context of three different classes.

Participants
Traditional-age (e.g. 18-24) undergraduate students in three classes with different combinations of educational media formats were surveyed.

Visual Communication (8 respondents): Half of class materials online; traditional textbook; traditional lectures. Online materials were lecture notes and Power Point presentations. Traditional lectures were performed based on textbook material.

Computer Graphic Design (10 respondents): On-line supplementary materials, traditional textbook, no traditional lecture. Online material was supplementary and included illustrated notes, Power Point presentations duplicated from class lectures, and Web pages of linkages to relevant additional material. A traditional textbook was used. Rather than traditional lecture, a coaching,

hands-on style of face-to-face teaching was used.

World Wide Web Publishing (16 respondents): All class materials online; no textbook; traditional lecture. Tutorials, lecture notes, Power Point presentations, multimedia presentations, use of the WWW as a personal slide projector were the online materials. Traditional lecture was performed in addition to material presented online. There was no textbook.

Instrumentation

Questionnaires were designed to measure concept learning and reaction to medium of presentation in each of three classes. Questions were formatted with 7-point Likert scale response options bounded by 1=very little and 7=very much.

Respondents in the the visual communication class assessed presentations using on-line delivery and, separately, assessed the use of PowerPoint in terms of concept learning, concept clarity, concept comprehension, concept application, concept understanding, and student comfort.

For the graphic design class, different combinations of educational media were assessed: the combination of text and on-line delivery; presentations based solely on the text; and presentations using only on-line delivery. Questions were constructed to assess the quality of educational experience of each format: concept learning, concept clarity, concept comprehension, concept application, concept understanding, and student comfort. Finally, students were asked whether they could master the material without the text.

Respondents in the World Wide Web Publishing class, which used no textbook, were asked to assess the extent to which having a textbook would contribute concept learning, concept clarity, concept comprehension, concept application, concept understanding, and student comfort to their learning experience.

Additionally, students' overall impression of on-line delivery was assessed for its enjoyment, interest, helpfulness, stimulation of learning, and its ability to retain attention. Ease of access to on-line materials at home, school, and work was also assessed for this class. Students were asked to compare slide shows using Netscape to lecture alone; to lecture with overhead; to lecture with Power Point, and to lecture with videotape. Finally, students were asked to consider whether they could master the material without an instructor.

Students in all three classes were asked whether on-line material puts too much responsibility for learning on the student.

Results

The goal of this study was to explore students' perceptions of educational outcomes for various educational media delivery formats. Both descriptions of attributes for several formats and comparisons across formats were examined. Questions specific to a class were analyzed separately. Total N may be reduced in some cases due to missing data. Results are presented primarily in tabular form to facilitate comprehension.

Graphic Design and Visual Communication: Description and Comparison

Perceptions of on-line learning were assessed by combining the responses from Graphic Design and Visual Communication to get an overall estimate. Since learning goals (e.g. application vs. memorization) may differ in effectiveness in the on-line format, perceptions of the on-line class format were compared across these two types of classes: Visual communication is a theory-driven class; Graphic Design focuses on application of principles and hands-on learning.

Extent to which on-line material provides the following aspects (learning variables) to educational experience:

Learning Variable (1)	Graphic Design (Mean)	Graphic Design (Std. Deviation)	Visual Comm. (Mean)	Visual Comm. (Std. Deviation)	Combined (Mean)	Combined (Std. Deviation)
Learning of Concepts*	4.50	.85	5.50	.76	4.94	.94
Clarity of concepts	4.40	.84	5.25	1.04	4.78	1.00
Comprehension of concepts	4.60	.84	5.25	89	4.89	.90
Application of concepts *	6.30	.68	5.00	.76	5.72	.96
Understanding of concepts	5.12	.97	5.13	.84	4.83	.92
Student comfort with class	5.00	1.05	5.50	1.20	5.22	1.11

1 Larger numbers = more of the attribute * Means for graphic design and visual communication are different at $p < .05$ (t-test).

Visual Communication Class: Power Point Perceptions (N=8)

Learning outcomes from using Power Point as a supplement in the classroom was assessed.

Extent to which Power Point examples given in class provide the following aspects (learning variables) to educational experience:

Learning variable (1)	Mean	Standard Deviation
Supplements learning material in textbook	6.25	1.17
Learning of concepts	6.00	.76
Clarity of concepts	5.63	.74
Comprehension of concepts	5.50	.54
Application of concepts	5.25	1.17
Understanding of concepts	6.25	.71
Student comfort with class	5.38	1.19

1 Larger numbers=more of the attribute

World Wide Web Publishing Class: Online supplant text (N=16)

One concern facing educators is the extent to which new media may supplant existing methods of instruction. To what extent may new media make textbooks redundant?

Extent to which a text would provide the following aspects (learning variables) to educational experience:

Learning variable (1)	Mean	Standard Deviation
Workload	4.88	1.67
Learning of concepts	2.88	1.93
Clarity of concepts	2.94	1.48
Comprehension of concepts	2.88	1.50
Application of concepts	1.75	1.24
Understanding of concepts	2.56	1.37
Student comfort with class	2.69	1.62

1 Larger numbers=more of the attribute

Overall impression of on-line delivery of classroom material:

Impression(1)	Mean	Standard Deviation
Enjoyment	6.25	.86
Interesting	6.19	1.17
Helpfulness	5.63	1.20
Keeps attention	5.88	.96

Personal slide shows using Netscape were compared with other class formats to assess the utility of various combinations of classroom presentation methods.

Frequencies for question asking for a comparison of personal slide shows using Netscape to other instructional formats:

Format	Netscape better	Netscape equal	Netscape worse
Lecture alone	12	4	0
Lecture with overhead	13	3	0
Lecture with Power Point	5	10	0
Lecture with videotape	5	9	2

Correlations of Impressions of On-line Delivery with Perceptions of Student Responsibility

Student impressions of online attributes should relate to their confidence in mastering material independently and the extent to which they feel overly responsible for their own learning. Therefore, impressions of online delivery were correlated with perceptions of mastery and responsibility.

Impression	Mastery without instructor	Too much responsibility on student
Enjoyment	.36	-.51
Interesting	.47	-.71**
Helpfulness	.45	-.70*
Keeps attention	.48	-.61*

*= significant at .01 level
** = significant at .001 level

Graphic Design and WWW: Correlation of Accessibility to Online Materials with Perceptions

of Independent Mastery and Student Responsibility

The extent to which students have access to on-line materials is likely to generate greater confidence in self-directed learning. Therefore, we correlated accessibility with perceptions of ability to master material without an instructor and with the belief that on-line learning places too much responsibility on students.

Responsibility	Mastery without instructor/text	Too much responsibility on student
Ease of access at home	.35	-.29
Ease of access at school	.21	-.50
Ease of access at work	.21	-.20

Discussion

Overall, students perceived strong learning outcomes from online materials and from mediated modes of education overall. For all classes, mediated forms of educational delivery were well above scale item midpoints. Online learning, furthermore, is perceived to be enjoyable, interesting, and productive of desirable pedagogical outcomes such as concept learning and application. From the comparison of theoretical and applied classes, one observes that online formats are likely to be helpful for both kinds of learning tasks

The effectiveness of online learning appears to be influenced by student access to material. The correlations between access and perceptions of independent learning and mastery were strong, though not always significant. A larger sample would undoubtedly increase the power of the statistical tests. Nonetheless, it seems clear that students who both enjoy and have access to online sources of information see these modes of delivery as pathways to learning independence.

Student perceptions reported here suggest that online and mediated forms of delivery may replace the traditional textbook format, at least for those students who accept and learn from online modes.

Differences in means for learning concepts and application of concepts is likely to be related to the content of the classes. Visual communication is a theory-intensive course taken prior to Graphic Design; Graphic Design implements in practice the principles from Visual Communication. Therefore, greater perceived learning of concepts for Visual Communication is not surprising, since concept earning is a large part of the class and likely to be salient to the students. Likewise, the application of concepts seems to be facilitated in the more applied class

Conclusions

It is clear, even in this small sample, beginning study, that the online delivery systems used generally helped students. Students liked and appreciated the material delivered in this manner. Students in the theoretical class found theory and concept more understandable. Students in the applied class found the application of theory to real world, hands-on situations more easily grasped and performed. It is clear, also, from the student feedback reflected in comments on evaluation forms used by the University that students were enthusiastic about the "process," without being daunted by the responsibility shift it demanded.

This is the beginning of a longitudinal study. It will gain statistical strength from the repetition of testing. The repetition of testing will also provide us with the more subtle discriminations that are needed to fully evaluate the different delivery procedures.

It would be ideal if two comparable sections of each class could be offered, one each with

media delivery online and one each with no additional media. In this case, that is not feasible. The only possible comparison that can be made is with previous classes taught in the traditional manner. That research is underway, looking at grades, graduation rates, comments from evaluation forms, etc... However, this approach presumes that the "classroom" experience would be the same, except for the media delivery of some or all of the information without begging the obvious question of "what is the classroom?". Farganis and Dunn raise other issues including:

... if on-line teaching re-defines the community of scholars in the classroom, is it more or less of a community? If being on-line changes the social life of the classroom how and to what effect does it change it? Is this a good medium for all institutions? Here it is suggested that in fact, only some schools will be able to afford the luxury of traditional education as we now know it, but that in the future other methods will become increasingly important. One of the interesting aspects of computer based education is that it lets education into the home and potentially this can alter the experience for both the teacher and the student. No matter where we teach from, it is naive to think that the classroom is private in the pure sense of the term, because we each bring our own personal experiences and biases to the forum. (Farganis & Dunn, 1996)

We also have discovered, as Windley noted, the class changes quickly as material delivered online is easy to change, update and expand when the delivery method is online:

The biggest problem this presents is that because of the dynamic nature of information on the web, I tend to update things frequently, correct mistakes, etc. Thus, the printed notes can quickly become out of date. This also means that you can't just print all off the notes at the beginning of the semester and make them available as a packet. Thus, as the semester progresses, I only make lectures notes available up through the current lecture (Windley, 1996).

The target of online delivery, as a method to augment, fully or partially replace other methods of teaching, is a moving target. However, summarizing 19 recent studies using online delivery systems, Witherspoon has reduced the problem to three general points.

I offer observations drawn primarily from the several project evaluations in which I've been involved, plus recent research visits to 19 U.S. institutions which are widely acknowledged to be doing good work in various aspects of online education. This experience is mostly, though not exclusively, related to higher education.

Three basic points will provide a framework:

The trite old saying is that the devil is in the details. In designing, installing, and operating systems of information technology, the devilish details, amplified by Murphy's Law, are always a factor. A great many programs are marked by wonderfully positive but wholly unanticipated surprises. For effective online education the technology is a necessary but insufficient component. (Witherspoon, 1995)

It is obvious this study will not provide any quick or easy answers. The variables under study are changing as the studies are done. The idea of "classroom" is an evolving concept with the introduction of new technologies. The very basic concepts of "learning" and what constitutes "teaching" are once thought known evolving as rapidly as the technology. It also is obvious, it is important to attempt to gain some understanding of this evolution. Philosophically, as Martin noted:

This, then, is the computer. It is the representation of our culture in digital code and the development of all the cultural possibilities that result. The computer makes cultural work easier to produce and reproduce, to preserve, to transmit, potentially accelerating intellectual attainment and opening cultural access in unprecedented ways. The computer greatly augments human powers of selection, memory, perception, and

calculation, potentially amplifying the intelligence that each and all can bring to bear upon the panoply of questions that life puts to them. Now we must turn to the implications of this computer to each activity in education (Martin, 1996).

Notes

Clark, R.E. (1983). "Reconsidering Research on Learning from Media." Review of Educational Research, volume 53, number 4, p. 445.

Clark, R. E. (1994). "Media Will Never Influence Learning." Educational Technology, Research and Development, volume 42, number 2, p. 21-29.

de Chardin, T., (1973). Towards the Future, Collins, p. 34-35.
Gillford, B. (1995). Educom Review, Nov./Dec., p. 36.

Farganis, S. and Dunn, R (1996). "Course Development," DIAL Conference, New School, New York, June 1996.

Green, K. (1966). "Annual Survey of Campus Computing," Claremont (CA) Graduate School, Claremont Consortium.. Available via cgreen@earthlink.net

Illich, L. (1970), Deschooling Society, Calder and Boyars, p. 125-156.

Kozma, R. B. (1994). "Will Media Influence Learning? Reframing the Debate." Educational Technology, Research and Development, volume 4, number 2, p. 14.

McLuhan, M., (1962). The Medium is the Message. Penguin. p. 34.

O'Donnell, James J. (1995). "Teaching with technology," PENN PRINTOUT, University of Pennsylvania Computing Center Magazine. Vol 11, No. 5.

Reid, A., (1994). "Perspectives on computers in education: the promise, the pain, the prospect," Active Learning, (December), p. 11-12.

Sangster, Alan (1995). "World Wide Web - what it can do for education," Active Learning, (July), p. 7.

Wiley, P. (1996). "Using WWW to augment classroom instruction," Research Report, Brigham Young University, Department of Computer Science. http://people/windley/windley.html.

Witherspoon, John (1995). "Assessment of online delivery systems at 19 Universities, " The Distance Educator Vol 1. Number 3 - Fall 95.
Appendix A
Note: The general class/professor evaluation instrument used for each class is both numeric and qualitative.
Students seldom fill in the open-ended portion of the "comment" section, however, the information below is taken
from the two questions concerning the use of the new media and the use of the textbook.

Appendix A

Teaching Effectiveness Questionnaire: Comment Sheet

Q 1: What aspects of this instructor's teaching were most effective?

"I like how Dr. Edwards brings his experiences and shares them. It is especially good when he shows these examples from the real world on the WWW."

"His use of materials was very beneficial. He provided us with his notes online to better assist us in class."

"Powerpoint presentations"

"It's nice to learn stuff and then have it explained and demonstrated on the WWW and in the PowerPoint. I really liked the real examples."

"PowerPoint with the handouts. Info. available on line."

"The use of the computer to help with the class lectures."

"The note sheets of his lectures, the handouts with the PowerPoints and the examples on line."

Q - 3: Please comment on the textbook, activities, assignments and media used in this course.

(Visual Communications 428/528)
"The textbook and the PowerPoint with the handouts were a great supplement to the lecture."

"The book followed along well with the class, computer online and in class computer presentations. It was all very beneficial and the online notes were really great."

"Book was interesting and easy to understand. Using the computer in class for presentations and the online notes were best and made the book more real as the online examples were from the real world."

(Computer Graphic Design 431/531)

"The textbook gathered dust because the online material and the Netscape presentations were great. The online helped review for exams especially. I hope there will be more things like this in this and other classes."

"Online media is excellent. Handouts are excellent. Netscape stuff was excellent. Textbook sucks."

"Textbook was ok. Other stuff was better, real and meaning was clearer."

"Using the online examples makes the ideas clear. Textbook got me confused and the examples are at least two years old. New stuff and real examples is better."

WWW Publishing Class Survey

This survey assesses your opinions about different ways of presenting educational material. For each question below, please circle the number that corresponds to your opinion.

To what extent would having a textbook for this class add to the following elements of the class?

Very little Very much
Workload ----------
1 2 3 4 5 6 7

Very little Very much
Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------
1 2 3 4 5 6 7

Very little Very much
Understanding of concepts ----------
1 2 3 4 5 6 7

What is your overall impression of on-line delivery of classroom material?

Enjoy very much Do not enjoy
Enjoyment ----------
1 2 3 4 5 6 7

Interesting Very interesting Very uninteresting
----
1 2 3 4 5 6 7

Not very helpful Very helpful
Helpfulness ----------
1 2 3 4 5 6 7

Stimulates learning Prevents learning
Stimulates learning ----------
1 2 3 4 5 6 7

Does not keep attention Keeps attention
Keeps attention ----------
1 2 3 4 5 6 7

How easily can you get access to the on-line materials via computer in the following ways?

Not at all Anytime
At home ----------
1 2 3 4 5 6 7

Not at all Anytime
At school ----------
1 2 3 4 5 6 7

Not at all Anytime
At work ----------
1 2 3 4 5 6 7

Please compare the personal slide shows using Netscape to other class formats, circling the answer (1, 2, or 3) that corresponds to your opinion:

Slide shows using Netscape were (1) better; (2) equal to; (3) less helpful than lecture alone.

Slide shows using Netscape were (1) better; (2) equal to; (3) less helpful than lecture with overhead.

Slide shows using Netscape were (1) better; (2) equal to; (3) less helpful than lecture with Power Point.

Slide shows using Netscape were (1) better; (2) equal to; (3) less helpful than lecture with videotape.

How confident are you that Not at all Absolutely
you could master this material ----------
without an instructor being 1 2 3 4 5 6 7
present?

Do you think that Not at all Absolutely
on-line material puts too much ----------
responsibility for learning
you?

Visual Communication Class Survey

This survey assesses your opinions about different ways of presenting educational material. For each question below, please circle the number that corresponds to your opinion.

To what extent does the online material provide each of the following aspects to your educational experience?

Very little Very much
Supplements learning material ----------
in the textbook 1 2 3 4 5 6 7

Very little Very much
Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------

1 2 3 4 5 6 7

Very little Very much
Understanding of concepts ----------
1 2 3 4 5 6 7

Do you think that Not at all Absolutely
on-line material puts too much ----------
responsibility for learning 1 2 3 4 5 6 7
you?

To what extent do the Power Point examples given in class provide each of the following
aspects to your educational ----------

experience?1234567

Very little Very much
Supplements learning material ----------
in the textbook 1 2 3 4 5 6 7

Very little Very much
Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------
1 2 3 4 5 6 7
Very little Very much
Increases understanding ----------
1 2 3 4 5 6 7

Graphic Design Class Survey

This survey assesses your opinions about different ways of presenting educational material. The following scales ask you to evaluate several combinations of classroom delivery methods with regard to several aspects of your educational experience. For each question below, please circle the number that corresponds to your opinion.

Consider presentations using both the textbook and online delivery. To what extent does

this combination provide the following aspects to your educational experience?

Very little Very much
Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------
1 2 3 4 5 6 7

Very little Very much
Understanding of concepts ----------
1 2 3 4 5 6 7

Consider presentations using only the textbook. To what extent does this method provide the following aspects to your educational experience?

Very little Very much
Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------
1 2 3 4 5 6 7

Very little Very much
Understanding of concepts ----------
1 2 3 4 5 6 7

Consider presentations using only online delivery. To what extent does this method provide the following aspects to your educational experience?

Very little Very much

Learning of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Clarity of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Comprehension of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Application of concepts ----------
1 2 3 4 5 6 7

Very little Very much
Student comfort with the class ----------
1 2 3 4 5 6 7

Very little Very much
Understanding of concepts ----------
1 2 3 4 5 6 7

How confident are you that Not at all Absolutely
you could master this material ----------
without the text? 1 2 3 4 5 6 7

Do you think that Not at all Absolutely
on-line material puts too much ----------
responsibility for learning 1 2 3 4 5 6 7
you?

[TOP]

Return on Instructional Technology Investment:

Getting the Bang for the Buck

Sylvia Bedwell Brace, Ed.S.

- Abstract
- Introduction
- MTSU's Instructional Technology Investment
- Understanding the Purpose of the Instructional Technology
- Providing Access to Instructional Technology
- Training in Instructional Technology
- Support of Instructional Technology
- The Return on Instructional Technology Investments
- Return on MTSU's Instructional Technology Investment for Students
- Conclusion

Abstract

Is the high cost of technology in the classroom really worth it? If the investment ever does "pay off," what sort of benefits are realized? After several years of investment in instructional technology equipment, facilities, and training, Middle Tennessee State University (MTSU) students and faculty are realizing the advantages that technology-based instruction can bring. A combination of survey results, faculty and student interviews, and documented changes that have been brought about at the University as a result of technology integration illustrates the rewards that have been reaped not only by students and faculty but by the University as a whole. Survey results and comments show that students who are exposed to technology in their courses attend class more often, have increased interest in the subject matter, and believe that they learn more. Faculty find that technology use enables them to re-think and restructure their courses and to receive local and national recognition because of their work with technology. The University as a whole is also gaining recognition due to the comprehensive level of support that faculty are given in their efforts to integrate technology into their teaching.

Introduction

A digital media center for $50,000, three new master classroom for $100,000, an instructional technology support specialist for $35,000 per year, and a campus-wide network for $2.5 million--the initial cost of instructional technology is high and the continuing cost is even higher. Like many other colleges and universities, MTSU has been faced with making some important decisions regarding its investment in and commitment to instructional technology. Several basic questions have been introduced along the way. Why use technology in the teaching and learning process at all? What will justify its cost? What value will instructional technology really bring to the University, to its faculty, and to its students?

MTSU's Instructional Technology Investment

MTSU's investment in instructional technology has been ongoing, a continuing commitment rather than a mere allocation of funds for hardware. This commitment stemmed from the mission of the University

to assist its students in becoming educated men and women by broadening their interest; helping them think logically, critically, and imaginatively; allowing them to communicate more effectively; and letting them acquire a basic understanding of a discipline. The commitment is mirrored in strategic planning that identifies instructional technology needs as important components to consider in planning for MTSU's future. It is also evident in day-to-day University operations.

Instructional technology resources at MTSU take many forms. Hardware investments have included computers in offices, labs, and classrooms; the campus-wide network; master classrooms; distance learning facilities; and instructional technology development centers. Other resources committed include support personnel, training facilities and materials, conferences, and award and grant money for instructional technology use and development.

Understanding the Purpose of Instructional Technology

In 1989, the administration of MTSU made a commitment to technology on a large scale when the decision was made to provide every full-time faculty member with a microcomputer. This important first step gave faculty a tool to assist with class management, course development, and research. It also exposed them to the possibilities of using technology in teaching and learning. After a few years of using their microcomputers for office work, more and more MTSU faculty became interested in using technology in the classroom. They wanted to know what they could do differently with technology. They wondered if their use of instructional technology would really be beneficial to their students. Obviously, faculty needed to know the possibilities of instructional technology as well as the advantages of using it before they were willing to expend the effort required to bring it into their own classes.

While technology such as computers and LCD panels had been on the MTSU campus for a number of years, before 1994 little was being done to integrate technology in the classroom. In the spring of 1994, a symposium that focused on how instructional technology is being used in higher education was held for MTSU faculty. Presenters from a variety of disciplines demonstrated how they developed multimedia applications and how they applied them in their courses. MTSU faculty discovered that technology would allow them to teach and their students to learn in a way that was previously not possible.

Other conferences and symposiums are held annually that feature the various ways technology can change how and what instructors teach. These conferences are particularly valuable for faculty who want and need continued support from their peers and instructional technology leaders. The continued financial investment made by MTSU to sponsor these important instructional technology events includes personnel, printing, and supply costs of thousands of dollars per year.

Providing Access to Instructional Technology

Faculty need access to technology of all types. Networked computer, audio/visual, and specialty equipment in faculty offices, classrooms, labs, distance learning facilities, and multimedia development centers must be readily available. The equipment must be reasonably up-to-date, stable, and reliable. It must also be adequately maintained and upgraded.

First and foremost at MTSU, every faculty member needed a networked computer on his or her desk. The initial investment made at the University to provide the campus-wide network and a computer for each faculty member was for millions of dollars with a continued investment of millions more. With their networked computers instructors began to use productivity software to type syllabi and tests, record grades, send and receive electronic mail, and create handouts and transparencies. Becoming acquainted with the impact technology can have on office tasks, research, communication, and printed materials is a crucial first step in the evolution of faculty's use of technology in the classroom.

The almost total absence of computer and audio/visual equipment in classrooms on the MTSU campus severely restricted the use of technology in the classroom. Prior to 1994, a few industrious instructors brought portable computers and LCD panels to class, but this setup proved limiting as well as cumbersome. Master classrooms made the necessary technologies both accessible and convenient to

instructors for the first time in 1994. These specially-equipped classrooms provide a wide range of computer, media, projection, communication, and control capabilities, including connection to the campus network. These rooms are easy to use and feature a wide variety of presentation and demonstration equipment including a computer, document camera, VCR, and laser disc player. MTSU has invested in eleven master classrooms with forty-six more in development for spring 1998. The initial cost of each master classroom ranges from $15,000 to $40,000 depending on the type and quantity of equipment installed. Continuing costs include the maintenance and upgrade of the equipment and the support of the faculty using the rooms. During the past two years, over two hundred MTSU faculty have taught in one of these rooms and have creatively used the technology to enhance, complement, or even reinvent their subject matter.

MTSU's distance learning facility developed in 1995 required an initial commitment of over $100,000 for facility renovation and equipment. Ongoing distance learning costs for connection to a variety of sites range from $15,000 to $25,000 per year. The distance learning facility permits the students at a distant site and the instructor and students on the MTSU campus to see and interact with each other as if they were in the same room. Documents and illustrative materials are shared by participants at each site.

Complementing office microcomputers, master classrooms, and distance learning facilities at MTSU are two fully equipped multimedia development center each housing approximately $50,000 in equipment and software. These centers developed in 1995 and 1997 feature specialty equipment that a typical instructor does not have in his or her office. Equipment in the centers includes color flatbed scanners, slide scanners, CD-ROM mastering systems, and video/audio digitizing equipment. A wide variety of specialty software is also provided. Instructional technology specialists, graduate students, and interns are available in the centers to assist faculty with the development, use, and integration of instructional technology. Their salaries and benefits as well as maintenance of the facilities and equipment create an ongoing cost for providing the centers for the faculty.

In addition to permanent facilities, instructors also need access to portable equipment. Two MTSU departments have a supply of equipment such as portable computers and LCD projectors and panels for faculty use. The initial cost of the check-out equipment was approximately $25,000 - $35,000 with a continuing cost of several thousands of dollars per year for upgrades and support. These check-out systems are in high demand and play an important role in making technology available "anytime, anywhere."

Training in Instructional Technology

While MTSU's investment in instructional technology includes computer, distance learning, and audio/visual equipment, the hardware investment is only the tip of the iceberg. Training faculty on the use of instructional technology and its integration in the curriculum is crucial. Faculty require a hands-on experience in workshops and orientations that are offered at convenient times.

With microcomputers arriving on campus in large numbers in 1989, MTSU's Office of Information Technology offered the first faculty development workshops. Initially, these workshops covered the use of operating systems; productivity software such as word processing, spreadsheet, and database; desktop publishing; electronic mail; and statistical software. Over the next few years, the workshops grew in number and scope to include the use of presentation and multimedia authoring software. Since 1995, an increasing number of workshops focus on the use of technology in the curriculum and instructional design. The resources necessary to offer the workshops include qualified personnel, training facilities such as computer labs and master classrooms, and training materials such as workbooks, sample files, and video tapes. The initial and ongoing cost of these resources is tens of thousands of dollars.

To make sure that faculty new to instructional technology facilities such as master classrooms, the digital media center, and faculty multimedia development center are comfortable using the equipment, orientations are offered several times each semester. One-on-one training sessions are conducted throughout the semester as well.

Additional training opportunities are available to MTSU faculty with the annual Mid-South Instructional

Technology Conference and Faculty Summer Instructional Technology Institute. These events feature a variety of presentations, workshops, and discussion groups that focus on the effective use of technology in higher education.

Support of Instructional Technology

Support is critical to faculty using instructional technology. They need technical support for the hardware and software in their offices and in the classrooms. They also need support for the development of technology-based instructional tools such as multimedia applications. The cost of providing this ongoing support is hundreds of thousands of dollars, one of the largest monetary commitments related to instructional technology that is made by MTSU.

Microcomputer specialists and technical support specialists provide faculty with technical support on computer hardware and peripherals as well as software applications. Technical support is also provided for audio/visual and distance learning equipment, modems, and network connections. This support includes acquisition assistance, installation and configuration of equipment and applications, and troubleshooting hardware and software problems.

Two instructional technology support specialists provide one-on-one assistance with the development of multimedia applications. Additional support includes consultation on the integration of technology into courses and instructional design. Through an Internet list service, the instructional technology specialists provide information to faculty on hardware, software, pedagogy, and training opportunities.

Many faculty understand that integrating technology into their teaching will enhance their courses and help them to communicate complex ideas to students more effectively, but they simply don't have the time to revamp their courses to accommodate the use of technology. Effective instructional technology takes time to develop and the demands on a faculty member's time does not allow for hours of development. To address this need, funding of $40,000 provides twelve grants in fall and spring for faculty release time and ten summer pay grants. Since 1994, fifty MTSU faculty members have received either three credit hour release time or summer pay grants. These grants give them time to rethink their curriculum and develop technology-based instructional tools for use in the classroom.

The Return on the Instructional Technology Investment

The instructional technology investment made by MTSU has been substantial but the rewards realized from the use of technology in the classroom have been significant. The University has benefited by gaining a competitive edge and regional recognition for its commitment to the use of technology in teaching and learning. Faculty have enjoyed a broadened resource base and advanced classroom tools that facilitate the teaching of multi-dimensional and complex subject matter. Students have experienced an enriched learning environment and enhanced communication.

The Return on MTSU's Instructional Technology Investment for Faculty

Instructional technology simply makes teaching and learning easier. It has given MTSU faculty the necessary tools to provide a quality education to a growing number of learners with diversified backgrounds and educational needs. Technology in the classroom has enabled faculty to easily add all types of information to their lectures. Also, it has enhanced faculty and student communication.

One of the main reasons that MTSU has made such a large commitment to technology in the classroom is that the faculty have found it to be a very valuable tool. In its simplest application, technology improves the organization and legibility of an instructor's material. A nursing professor commented that technology allowed her to make her lectures "more visual." In more complex applications, technology allows presentation of materials in the classroom that would otherwise not be possible. For instance, one MTSU professor is working on using technology in the classroom to create a virtual workplace.

Technology enables MTSU faculty to bring the information world into their classrooms. They are able to display and demonstrate information from a variety of sources including the World Wide Web, Gopher

servers, newsgroups, and other Internet resources. An MTSU economics professor at MTSU found the ability to manipulate and search large amounts of current information in his classes very beneficial. He felt that technology-based resources in the classroom gave his course an international flavor and brought life to some topics that had previously been pretty dry.

Communicating effectively with students is always a challenge for a busy faculty member. MTSU faculty find that the communication they have with their students is improved through the application of WWW page postings, Web bulletin boards, discussion groups, listservs, and chat sessions. A biology professor found that he was actually able to interact more with his students when he added electronic communications than when he relied solely on more traditional means. He found that student communications involved more individualized instruction that is valuable to increasing student interest and understanding.

Return on MTSU's Instructional Technology Investment for Students

Traditionally, higher education institutions have not fared well in measuring the benefits of technology-enhanced course delivery versus more traditional methods of instruction. This failure has likely occurred because of their unwillingness or inability to look beyond institutional costs and benefits to those of their major constituency--the students. When MTSU evaluates its instructional technology investment, it is with the students that the University finds the best return.
With improved interest in and understanding of the academic subject matter, increased opportunities, and better preparation for the future, MTSU students have experienced the greatest payback on the investment.

Study after study is beginning to demonstrate that students who are exposed to technology in the teaching and learning process learn better and learn differently than students who aren't. Technology in the classroom appeals to the variety of student learning styles in a way that is not possible with traditional lecture. Several faculty members have noted marked improvements in student grades with their applications of technology in the classroom. They have found that instructional technology used effectively increases student comprehension and understanding of even the most complex subject matter.

The best technology used in MTSU classrooms is the one that is almost transparent to students. When instructional technology is used effectively it is the content and the increased learning opportunities not the technology that students remember. One instructor inte

A Systematic Approach to Training Faculty to Teach via a Two-Way Interactive Television System

Karen Jarrett Thoms, Ph.D.

- Abstract
- A Systematic Approach
- An Introduction to ITV
- Making ITV Work for You
- Conclusion
- References

Abstract

Teaching via ITV is more than merely pushing a few buttons. Teaching effectively using this instructional medium requires a systematic approach to course design; materials design and development; equipment; delivery; remote site originations; computer interaction with ITV; computer-delivered presentations; and legal, administrative, and ethical issues. Extensive training is critical to assure teaching effectiveness. Thoms will discuss a Title III grant-funded set of training modules created to help faculty learn to use this delivery medium.

A Systematic Approach to Teaching via a Two-Way Interactive Television System

Teaching via a two-way interactive television system is more than just pushing a few buttons and talking into a microphone. Using this instructional medium effectively requires a systematic approach to course design, materials design and development, equipment, delivery, remote site originations, computer interaction with ITV, and computer-delivered presentations. It is critical, also, that faculty understand the administrative, legal, and ethical issues related to teaching via ITV.
Today, interactive television (ITV) is bringing many changes to teaching methods and materials design and development. ITV is a very expensive technology and often requires an instructor to redesign a course which has been taught previously in a traditional classroom setting. According to Savage (1995, 90), the instructional methods necessary for teaching on ITV systems are comparable to the regular classrooms, with a few adjustments. This presentation will look at those "few adjustments" which differentiate strategies and equipment used in a traditional classroom and those used in an interactive television classroom. It is the joint responsibility of teachers and administration to assure the instructor is prepared to use the system effectively.

This presentation/paper will address a systematic approach to training faculty to teach via the two-way interactive television system. This training includes course and materials development and design, equipment operation, and other topics listed below:

- Introduction to ITV System
- Making the ITV Work for You
- Course Design for ITV
- Course Materials Development for ITV
- Operating the Equipment
- Sources of Distance Learning Materials, Programs, and Courses
- Remote Site Origination

- Videoconferencing
- Computer Interaction with ITV

Legal, Administrative, and Ethical Issues Related to ITV

Savage (1995) identifies some recognized advantages of offering courses via ITV include reaching out to small groups of students, breaking down the barriers of time and distance, making education received in small schools comparable to that received in larger schools, offering nontypical courses to groups of students, meeting people's needs for convenience and quality education, breaking down rivalry barriers, giving students the opportunity for non-lecture classroom instruction (i.e. discussion, teamwork, and problem solving activities). Morehouse (1987) points out problems or constraints of ITV: student cheating, lack of personal contact with students, movement and space restrictions, technical difficulties, and conflicting location (school) calendars and schedules.

Savage (1995) indicates that training for faculty must be available, and faculty should avail themselves of the training opportunities by attending the training sessions. This availability of training was the basis for the Title III faculty development grant at St. Cloud State University. The grant provided for ten training modules, as identified above, and presentations to faculty. The topical content for each module is discussed as items which, if applicable to a particular ITV system, might be included in training.

An Introduction to ITV

A basic introduction to the interactive television concept may be necessary, especially if faculty are unfamiliar with this delivery medium. Understanding the terminology or jargon of ITV will provide a basis for faculty using the system. This terminology may include terms such as interactive video, instructional video, distance learning, video conferencing, local access, remote site, graphics camera, instructor camera, SWAP, PIP, and open-audio. In addition to terminology, faculty may want to know more about the history and development of interactive television on the campus and within a network or system.

For the initial training session, show faculty how easy it is to use the system, possibly bringing in one of your system's "shining starts" of ITV delivery. At this first session, it is also a good idea to not only show how easy it is to operate the system, but also explain the different monitors, control board/display panel operation, etc.

Making the ITV Work for You

In this module, the faculty member should learn about syllabus construction, the ITV equipment, and technology and assistance available at remote sites.

Developing an course and constructing a syllabus for an ITV course is much different from one created for a traditional classroom. Organization, planning, teaching strategies, creativity, and instructional technology vary considerably from the regular classroom. For example, make allowances for office hours; since students cannot just "drop in" with questions, the ITV system could be used for one or two hours a week for students to ask questions. In addition to ITV, the students can also connect with the instructor via e-mail or telephone.

The course syllabus should contain all the "vital statistics" of the course: relevant telephone numbers (including fax and trouble numbers), guidelines and rules for the course, assignments with in-depth written instructions, and materials to be graded (including criteria and grading schedule). If these materials are made available the first class session, then throughout-the-term mailings will be reduced. If at all possible, have all students enrolled in the class attend the first class session at the hosting site. People will be able to meet others in the class, adding to the interpersonal relationship component of the course. Students will feel a part of the class, even if they will be located at one of the remote sites.

When teachers plan a course, they need to vary the teaching strategies used; lectures should be limited to

15 minutes, and then another strategy should be used, perhaps question-and-answer or small group discussion. Faculty should incorporate the use of visuals in their ITV course, supporting the second channel of instruction concept. More on visuals will be discussed in another module.

Course Design

Course design is critical to the success of an ITV course. Although course content may be the same as that in a traditional academic classroom, certain considerations must be taken when preparing to teach a distance education course. The following guidelines can be used in training faculty to design courses to accommodate the ITV medium.

First, it is important to select the behavioral objective(s) that will be addressed. Then identify how each objective will be addressed. Select the objectives first, then identify how they will be met, observed, and measured.

Include participants at off-premise sites in all discussions, and be certain to include a sequence of activities which include active participation. The course may be designed to have students use the ITV system as a means for brainstorming with small groups and also as the delivery medium for groups located at a single site.

Course Materials Development

Course materials preparation is vary important for successful ITV teaching. Although the course content may be the same as that in a traditional classroom, certain design guidelines must be followed in order to prepare materials which can be used effectively with the ITV network.

The following guidelines should be incorporated when designing and developing instructional materials:

1. Use color rather than black-and-white visuals whenever possible.

2. Use photographs rather than simple drawings if they will make the content more understandable.

3. Use realism in form and color.

4. Use the "simple over complex" approach for younger learners, the "complex over simple" approach for adult learners.

5. Incorporate the elements of design.

6. Use easy-to-read color combinations for transparencies (black on yellow; green, red, or blue on clear acetate; white on blue, or black on clear). Yellow on black, yellow on red, yellow on green are more difficult to read.

7. Use balance on visuals rather than information all being on left side of visual.

8. Use plain letters (sans serif) rather than decorative. Plain letters would include Geneva or Helvetica style, while serif letter style would include Palatino, New Century Schoolbook. The decorative style would include Old English, Onyx, Machine, etc., and should be avoided because they are more difficult to read.

9. Use the same (or perhaps only 2) letter styles through the visual series.

10. Use upper and lower case lettering rather than all-capital words; titles can be capitalized, but the rest of the visual should be upper- and lower-case.

11. For transparencies, the recommended font size is 24 or 36; for computer-delivered

presentation, font size 36 is the minimum.

12. Allow plenty of "white space" on all visuals to keep it uncluttered.

13. Use a horizontal format for transparencies and computer-delivered presentations.

14. Avoid hand-written transparencies and masters whenever possible.

15. Use key words and phrases rather than whole sentences in most situations.

16. Use italics, bold, underlining, or color emphasis, but don't overdo it.

17. Use headings and side headings for organization.

18. Put a single concept on a "screen" or frame.

19. Break down complex visuals into simpler ones to build them up step by step.
20. Use consistent background colors in a series of visuals (for continuity).

Operating the Equipment

Use skills and knowledge from previous training sessions to avoid problems and pitfalls associated with ITV. Have faculty practice, practice, practice using the

ITV equipment and materials which they develop. Let them compare how their materials from traditional classrooms transmit across the ITV lines (split the group and put in two ITV classrooms, if possible).

Show the faculty member how to operate the equipment, including the auxiliary technology. Let them experiment with SWAP, PIP, and switching back and forth between options. This is the point in training to "loosen up" and experiment; giggling is allowed! Training on the ITV equipment is critical, and often the students learn from mistakes; they then appreciate the guidelines listed above and how complying will help with their teaching effectiveness.

Sources of Distance Learning Materials, Programs, and Courses

Most schools may still be limited to in-house course delivery. However, other institutions have moved beyond that point and are able to downlink programs and courses from elsewhere (other institutions, the PBS Adult Learning Satellite Service, etc.). If your institution is considering these options, you may wish to contact the individual provider for rules, guidelines, and procedures to participate.

Remote Site Originations

Most educational courses offered via ITV are of the "home grown" variety: faculty design, develop, and deliver the academic course. The educational institution is usually the hosting location, while schools within the area are the receiving sites. It doesn't have to be that way, however.

Remote site origination can be used for an instructor who is teaching only students at another site, with no students with the presenter. Or, as some faculty have done, remote site origination can be a site where a guest presenter from somewhere in the region can present to the class. Training of the presenter at a remote site, especially if it is a one-shot deal, is frequently overlooked and downplayed. If possible, have the presenter meet with a technician or experienced ITV instructor at the remote site; if that is not possible, telephone and ITV training by the course instructor with the guest presenter can be effective.

Remote site origination is not that much different than on-site origination. The presenter must keep in mind, however, that student feedback (nonverbal, especially) is missing at the remote site. In addition,

the "wait time" or "lag time" between questions and answers can be 5-15 seconds (but seems to be 5-15 minutes). A presenter at a remote site also must remember to talk to the camera, but to the monitor. The presenter can pretend that the camera is an actual person rather than an inanimate object. By speaking to and looking at the camera, the presenter gives the impression of speaking directly to the audience back at the hosting site.

One more tip to keep in mind. Because students at the remote site tend to feel isolated or at least away from the rest of the class, it is advantageous for a faculty member to visit the off-premise or non-hosting site once or twice during the term; this gives the on-campus students a sample of what the off-premises students experience, and these visits also bring a closer relationship between the instructor and the off-premises students.

The last topic relating to a remote site origination (as well as regular use of an off-premise location) deals with scheduling. A proactive rather than reactive plan is recommended. Not all locations maintain the same calendar of school days, especially when university classes are transmitted to community colleges or high schools; all too often the hosting site is ready to transmit and students at the off-premise location are standing outside a locked door with no school employee nearby to let them in. Contingency plans are a must; make sure the students have a "trouble number" to call in the event this happens; this telephone number might connect to the main office, the administrator, or some other designated person..

Videoconferencing

Videoconferencing is a business-related use for the interactive television system. It is being used on a more frequent basis than was anticipated just a few years ago. Although not a panacea for problems, teleconferencing has proven beneficial in some business and education situations. There are a number of advantages as well as disadvantages.

Advantages of videoconferencing include: reduction or elimination of travel costs, reduction in time away from the workplace, increase in the number of people who can participate in a conference, reduction in the cost of registration at meetings, increase in collaborative or cooperative projects, greater participation between and among distant staff members, and extension of boundaries to include international participation.

Although the above list identifies some very positive aspects of videoconferencing, there are some problems, pitfalls, and disadvantages which must be addressed. The startup costs are substantial, especially if state-of-the-art equipment is used. Startup costs must include not only equipment, but also room preparation, training of users, and remuneration for users. It is better to designate a permanent space for the ITV facility rather than use a portable system. Another problem with using ITV for videoconferencing is that it does, indeed, hinder person-to-person interaction, and some people become the "invisible group" and may be forgotten. Equipment failures occur Q someone once said that Murphy's Law goes into overdrive every time the ITV system is used. There are other pitfalls associated with using the ITV for videoconferencing purposes, but the ones listed above are the major ones.

Computer Interaction with ITV

In a previous module, interaction of peripheral equipment (cameras, fax, etc.) was addressed. What can the computer do for ITV? The answer is LOTS! Whether the computer system is Macintosh or PC based, the transmission can be quite good. However, a little common sense needs to be applied. The print must be large, the background and text colors must be very different, and a basic rule applies Q those in the back of the largest room being used must be able to see (and read) the material on the monitor.

Quite a few "tricks of the trade" were provided in the module addressing course materials development. Just a few additional tips: use a 3-4 proportion, horizontal format, "bleed area" as a border on edges, plenty of white space, one concept per screen, overlays and transitions as needed, examples and non-examples, the KISS (keep it short and simple) approach, visual cues (arrows, numbers, bullets, motion or direction indicators, etc. Keep in mind the suggestions regarding lettering (font style) and size.

Divide long lists into groups of 5-7 items per list.

The computer interaction is making teaching via ITV much easier than before. The computer-delivered presentation can be planned and prepared in our office or on our home computer and then brought to class on a disk; that sure beats bulging brief cases, file folders, etc.

Legal, Administrative, and Ethical Issues

The last module that is presented to faculty who will be teaching via ITV is one which deals with issues which tend to blend together: legal, administrative, and ethical issues. Some issues are very much one type, while others are part of what we call the "muddy water" issues. Only a few will be discussed here.

Legal issues may parallel a contract, which may identify reassigned time for course preparation, materials development, and/or general restructuring of the course. Included in the contract may be specific contract requirements for remuneration for teaching an ITV class. Another legal issue has to do with the distance education philosophy that all connected sites for a course constitute a single classroom, supporting the "classroom without walls" concept. What's acceptable and legal in a regular classroom is usually, but not always, permissible in an ITV class. Two issues come to mind: fair use provisions of copyrighted material and videotaping of students.

The use of copyrighted material transmitted via ITV is still questionable, as is a great number of issues about copyright. Cyrs and Smith (1990) give the following paraphrased advice about materials for telecourses:

1. To be safe, obtain written permission from the copyright holder (usually the publisher, not the author), for all copyrights materials used in telecourses.
2. Fair Use guidelines relating to television are still not clearly delineated. Courts have looked at fair use cases on an individual basis.
3. Many telecourses are made with the intent to sell and distribute multiple copies, which put those producers in great jeopardy of falling outside the interpretations.
4. Be careful, be cautious. Most copyright holders will give permission without cost or charge a fee. If a fee is charged, pay it and pass on the cost to customers. Word of wisdom: keep very good records of the communications.

The second question has to do with the legality of videotaping classes. If an instructor wants to videotape a course, the students need to be aware of this at the start of the first session. The instructor should identify the parameters of use of the tape: makeup, review, etc. It is not imperative, but it is strongly advised, to have students sign an agreement that the tapes may be made; in the event a student objects and the instructor still wants to make the videotape, the student may be moved to a location that is outside the scope of the cameras. If an instructor takes a videotape to a conference as part of a presentation, permission should be secured from each student appearing on the videotape. It does get confusing!

Administrative issues might include selecting courses to be offered via ITV, identifying faculty to teach via the ITV system, scheduling ITV courses, identifying to which locations the course is transmitted, videotaping of the classes, and rebroadcasting the videotapes. Administrators frequently base the course selection to need/demand, whereas selection of faculty may be viewed as "plum or prune" treatment.

Some of these issues segue right into some ethical concerns, which some institutions have chosen to address, while others are waiting to be reactive when a problem arises. Some of the ethical issues include rebroadcast of the course without the faculty member's permission or knowledge, size of the class, people who have access to the videotapes, library access to off-premise students, comparable assignments for both groups, availability of the best teachers to teach over the system, ownership of the course (institution vs. faculty member), displacement of teachers, marketing of program or course, admission criteria for students, and student access to instructors.

The above administrative, legal, and ethical issues can be real eye-openers to teachers who will use the

ITV system. Many of these issues are not relevant to a regular classroom course; others are. These issues cannot be aside and ignored. There is an obligation to at least make faculty aware them.

Conclusion

Teaching via the interactive television system (ITV) can be a real boon to education. To help alleviate some of the constraints and problems associated with interactive television, a thorough understanding of the design, development, and delivery of a course via ITV is critical. Whether this training is provided by an ITV coordinator, a faculty development officer, or an experienced ITV instructor, the necessity is still there for this training. To be effective in the ITV classroom, the instructor needs training in (or least an understanding of) the ten modules described above.

References

Cyrs, Tom and Frank Smith. (1990). *Teleteaching: A Resource Guide* (2nd ed.). Las Cruces, NM.

Morehouse, D. L. (1987). Analysis based on the evaluation of Minnesota's technology demonstration program. Minnesota State Department of Education, St. Paul, MN.

Savage, Patricia. (1995). "Interactive Television in the Classroom" in Technology in the Classroom. No. 33, pp. 86-94.

[TOP]

Converting a Desktop Video Conferencing System to Classroom Use

Liz Johnson

- Abstract
- Converting a Desktop Video Conferencing System to Classroom Use
- Software Upgrades
- Hardware Additions
- Improvements in Features
- Improvements in Performance
- Room Layout
- Expectations

Abstract

An inexpensive desktop video conferencing system can be converted for use in a classroom with software upgrades and hardware additions. Improvements in features and performance have occurred in this technology over the past year which make this possible. Students can interact with a remote instructor by audio, video, and keyboard. Certain patterns of room layout maximize the possibilities.

Converting a Desktop Video Conferencing System to Classroom Use

Desktop Video Conferencing (DVC) was conceived to transfer audio, video, and data in a business environment from one individual work station to one other. Educators thought that there must be a use for DVC in their environment as well. Some schools began trying it out for advising, testing, or placement. Almost in the same breath that advocates praised the potential of the technology it was also judged inadequate. "This would really be great if...the video were better... the audio were better...it could multi-point...the screen was bigger." In an effort to bring the costs down educators asked "How could it be used more often to benefit more students?" The obvious use is course delivery, but DVC would be incredibly expensive if it could only be used with individuals either on an individual studies basis or in a classroom with individual workstations. It would be a very inexpensive tool if somehow it could be used with groups of students.

The subject of this workshop deals with the question of how to convert a technology that was intended for individual use in a business, to group use in education. Fortunately, the demands of business have benefited education as well. Education can take advantage of many of the advances that have occurred over the last year to make DVC more responsive to the needs of business. For example, it was thought originally that fast, smooth video was not necessary for DVC because the picture was so small. However, the quality of broadcast television has spoiled the consumer. He doesn't know why the picture and audio are better on his tv at home nor does he care. He simply demands the same quality whether it is carried by cable, satellite or telephone line. Industry responses to this and other demands are making DVC more viable in the classroom. There is every reason to believe that these improvements will continue.

Software Upgrades

MTSU bought a ProShare Personal Video Conferencing System 200 in 1995. A few months later we received a free upgrade. In 1996 we purchased version 2.0. It proved to be a dramatic improvement in many ways. Motion was smoother. Picture quality was better. The interface was easier to use. It included

a choice of built in links to multipoint service providers.

Hardware Additions

Because we wanted a larger picture we purchased a PCI board which would produce full screen video at a single mouse click. However, the ATI version that we bought was difficult to install and is not Windows 95 compatible. Intel recommends other PCI boards. These are listed in the ProShare ReadMe file.

Originally we tried connecting the DVC system to a 27" NTSC monitor through a scan converter. However the picture quality proved unsatisfactory. We now intend to use a 27" SVGA monitor instead and expect a much better result. Although the cost of an SVGA monitor this size is quite high, the improved picture is worth it.

Due to the upgrade to 2.0 it was recommended that we add 8 mgs of RAM. This was a quick and inexpensive addition.

For full duplex audio in the classroom we purchased a US Robotics ConferenceLink Performance Telephone with two extensions. Students in different classrooms will be able to share audio without having to operate individual microphones.

We plan to install the DT-100 AF compact Elmo document video camera to the S-video output of the ProShare card through a scan converter to give instructors the ability to show documents and specimen from a second camera. Either this camera or the ProShare camera will be able to rotate to show a view of the classroom A major limitation of a DVC system is that it has only two camera ports. The Elmo will also allow the instructor to use presentation software such as PowerPoint for displaying information. This will compensate for loss of ProShare's main distinguishing advantages when transmitting between a ProShare and a room system: its flexible white board and its ability to share documents and applications. The Elmo can also add extra video ports for more cameras if necessary.

Improvements in Features

Some new features have been long awaited such as the use of industry wide standards. ProShare 2.0 has added three new standards to be compatible with a range of other systems. H.320 is the universal video conferencing standard. T.120 is the standard for data conferencing. Digital SVD (Digital Simultaneous Voice and Data) is the standard for conferencing over phone lines.
Multipointing is another long awaited feature. ProShare 2.0 allows calls over ISDN, networks, or modems. On ISDN several callers can connect simultaneously. On network calls, up to 5 participants can share data. Voice contact must be made over a phone line. Modem connections allow video to one other person over phone lines.
Other features are less anticipated but none the less welcome. The video windows can be arranged in a variety of ways to maximize screen space including picture-in-picture. Business cards allow multiple participants who are data conferencing to see pictures of each other. The Photo Exchange allows participants share still photos. A Participants Bar shows the names of all participants. A Turntaking button prevents ìcursor wars.î

Improvements in Performance

Version 2.0 has enhanced video resolution and motion. But because more information is expected to go through the same lines ProShare asks the user to make a choice. Do you prefer better video or smoother motion? The user can switch between these options under Video Preferences in the Tools menu. When a still object or document is being shown, a better picture might be preferred. When a procedure is

demonstrated, a smoother motion can be chosen. It is not necessary to constantly switch between these options but when one or the other can make a difference the option is available.

Room Layout

Room layout is just as important, if not more so, when planning to use DVC in a classroom as it is when using a room system. Acoustic ceiling tiles and carpeting are essential. Acoustic wall tiles may also prove necessary. DVC is a small system intended for close-up contact. It should not be used in an open room or in a room that is too large. It should also not be used in a noisy environment. A small class of from five to fifteen students is preferred. This is the usual size of most of our rural distance learning classes. Because of the need to use a ConferenceLink phone instead of individual mics, students will be arranged around both sides of long tables placed in a U shaped arrangement. This will insure that all the students will be close enough to the ConferenceLink phone.

Expectations

Although we have not yet used DVC for course delivery in a classroom, we have tested all the components and trained teachers in its use. Both the teachers and Continuing Studies are confident that DVC will be able to perform adequately. We expect that, whereas the video may still be slower and have less resolution than a room sized compressed video system, it will be adequate. We expect the audio in this particular room to be a little strained, but that in a smaller setting, as we intend to use it in the future, it will work satisfactorily. We expect that the teachers will be able to illustrate their lectures with presentation software, slides or any other media that they could use with a room system. We have tested the ProShare with our VTel MCU and with a PictureTel DVC system. Both performances were flawless. We expect ProShare to multipoint through the MCU with up to five sites. We expect the teachers to find ProShare easy to operate and that once they learn to use it, they will require little support. We expect the students to find the DVC system easier to use than a room system with almost the same quality. We expect DVC to cost one third that of a room system. If these expectations are met, MTSU will deploy many more DVC classrooms through out rural Tennessee.

[TOP]

Designing the Computer-Mediated Conference: Improving a Conference's Productivity

H. Willis Means

Terence C. Ahern

- Introduction
- The Study
- Discussion
- Conclusion
- References

Introduction

Computer-mediated communication is experiencing almost exponential growth. Microcomputers equipped with high speed telecommunication hardware and software, which, but a few years ago, were high-priced options, are now standard equipment. Parents are demanding their children have access to and make use of computer-mediated communication. Schools are responding by using the World-Wide Web, e-mail, listservs, and electronic bulletin boards in their classrooms.

However, the research in computer-mediated communication has focused on the products of computer-mediated conferences in such areas as decision quality, group commitment, and time required to reach a decision or the impact of physical characteristics of the computer-mediated communication software. What has been neglected are the effects of design variables such as conference composition and task-type upon the productivity of members of computer-mediated conferences.

Group composition, the subject of a considerable body of research in face-to-face decision-making research, has been all but ignored in computer-mediated communication research (McGrath, 1990; Hollingshead, McGrath, & O'Connor, 1993; Hollingshead & McGrath, 1995). It is as if researchers in computer-mediated communication "believed that 'if you have seen one group, you have seen them all'" (Hollingshead & McGrath, 1993, p. 90).

The effect of task-type upon member productivity during computer-mediated conferences is another area of computer-mediated communication which has not been adequately controlled in prior research. Hollingshead and McGrath (1993 from McGrath, 1984) developed a task circumflex to categorize task-types in a mediated environment. The circumflex assigned tasks to one of four quadrants based upon the performance required of a group member. Tasks that fit in Quadrant I: Generate, include brainstorming, goal setting or agenda setting, and tasks related to generating potential alternative solutions. Tasks that fit into Quadrant II: Choose, include tasks that enable the group to choose the "right" answer from those available and tasks that enable the group to choose among alternatives. Tasks that fit in Quadrant III: Negotiate, are tasks that enable the group to resolve conflicts. Tasks that fit in Quadrant IV: Execute, are tasks that constrain a group as it goes about producing a product. Included in Quadrant IV would be time constraints, decision quality, and final product form. This study focused on Quadrant II.

The Study

The design of this study was a two-by-two factorial design. Therewere two independent variables in this study: group membership and task-type. The first independent variable, group membership, consists of two levels: students with a verbal score of 500 or above on the Scholastic Aptitude Test (SAT) and those

with a verbal score of less than 500. The second independent variable, task-type, consists of two levels: an intellective or well-defined task and a decision-making or ill-defined task. There were six dependent variables. They are: (1) the length of a participant's message, (2) the number of comments read by a participant prior to making a comment, (3) the number of other nodes to which the participant links a message, (4) the number of times a node is accessed by other participants, (5) the total number of links a node has to other nodes, and (6) the length of
a session in minutes.

A total of 85 students enrolled in a computer literacy course at a large southwestern university participated in the study. The computer-mediated conferences were created by initially dividing the participants into two pools based on their verbal Scholastic Aptitude Test (SAT) scores. A total of fourteen conferences (seven with SAT verbal scores of 500 and above and seven with scores below 500) were formed. Participants were randomly assigned to the conferences. Finally, the task-type assigned to a conference was determined by a coin toss.

There were two dilemmas used in this study. One dilemma was classified as an intellective task or well-defined; that is, it had a definite right or wrong answer (McGrath, 1984). The second dilemma, decision-making or ill-defined, is one that does not have a definite right or wrong answer. The software used in this study was the IdeaWebô (Ahern,1995). The IdeaWeb, in contrast to other types of computer-mediated conferencing software, is visually oriented. This
feature enables members of the computer-mediated conference physically to link their comments to comments already made. It also simplified the process of determining who not only said
what, but where, in the conference, a comment fit (Ahern, 1995).

Data Analysis

The data collected by the IdeaWeb was analyzed in two phases: Network Analysis and Structural Analysis. First, network analysis was used to identify the strength of the relations between and among the participants in the conference. The primary network analysis measure used was centrality.

Centrality is a measure of how "in the thick of things" (Freeman, 1978, p. 219) a member of a conference is. The derived centrality measure was a ratio of all the relations for a participant over all the relations in the conference. Thus, the larger the centrality index, the more its members related to each other and was an indicator of a member's potential communication.

The initial measure of centrality used in this study was developed by Nieminen (1974) and was used to identify those conferences to be examined further. While centrality was an individual measure, a conference centrality rating was calculated for each conference so as to provide a method to rank the conferences preparatory to selecting those for further study. The fourteen conferences were divided into three groups: relatively low-centrality (ratings less than 0.190), relatively medium-centrality (ratings greater than 0.190 and less than 0.340), and relatively high centrality (ratings greater than 0.400) based on their conference centrality rankings. The ratings for each conference may be found in Table 1.

Centrality ratings were used to select the four conferences for further network analysis. The four conferences represented two conferences with a relatively high centrality rating and two
with a relatively low centrality rating. The two types of group composition (homogeneous and heterogeneous), and the two task-types (well-defined and ill-defined) made it possible to compare the effect of each upon the six dependent measures within an between conferences of different composition and task-type.

Conference eleven, a homogeneous well-defined conference, would be expected to have less interaction among its participants(Chapanis, 1988) than conference twelve, a heterogeneous ill-
defined conference. In general this was not the case (see Table 2). For example, members of conference eleven averaged 50.26% more words per message; they spent an average of 28.18% more time per session; they visited 49.1% more nodes before leaving a comment; they had an average of 17.11% more nodes linked to their comments; and they had an average of 18.12% more total links than did the

members of conference twelve. There were only two categories in which conference twelve exceeded conference eleven: the number of nodes to which a participant linked his/her comment (3.9% more links) and the average number of comments made (12.5% more comments). It would appear that the members of the homogeneous well-defined conference, eleven, exhibited traits more typical of a heterogeneous ill-defined conference in all but two areas.

Conference eight, a heterogeneous ill-defined conference, would be expected to exhibit more interaction due to its composition and task assignment. This was the case in three areas: the number of nodes to which a participant linked a comment (29.96%), the total number of links either to or from a participant's node (33.54%), and the number of comments left (11.42%). In the other four areas, conference eight exhibited behaviors less than that of conference one: the average number of words in a message (38.21%), the duration of a session (21.65%), the number of nodes visited before leaving a comment (65.65%), and the number of nodes to which a participant linked a comment (20.49%).

The atypical conferences in each conference pair exhibited behaviors that, in the main, exceeded the behaviors displayed by the conference representative of the category. For example, the average behaviors exhibited by the members of conference eight, the atypical conference, exceeded those of conference one in three areas. The fact that they averaged less interaction in four areas, in addition to having comparable conference centrality ratings, indicated that members of conference eight, at least in those areas, exhibited behaviors more characteristic of a homogeneous well-defined conference. A comparable pattern emerged in the high centrality rating conference pair. Conference eleven, the atypical conference, exhibited behaviors in excess of those of the conference twelve in five of the seven categories. It appeared something was occurring within the conferences which had an effect upon individual productivity as measured by the six dependent variables.

The results of the network analysis suggested some relationship between conference composition and task-type. Structural analysis was then employed in an attempt to ascertain more fully the nature of the interaction. The structural analysis tool used in the study was Q- Analysis (Atkin, 1974). Q-graphs, the result of mapping an adjacency matrix similar to the one used in the network analysis, enables the researcher to visually represent the interactions of the conferences based upon membership (simplical complexes) andtopic (conjugate simplical complexes). The first four Q-graphs illustrated the relationship between conferences membership and the topics discussed. The Q-graphs for conferences one (Figure 1) and eleven (Figure 2) were consistent with what one would expect for a homogeneously grouped conference; that is, they displayed a connected structure with a majority of members interacting with each other. Conferences eight (Figure 3) and twelve (Figure 4) displayed a structure consistent with what would be expected of a heterogeneously grouped conference.

The Q-graph, in both cases, showed two sub-conferences, occurring within each conference; and only in conference eight was there a topic at which the sub-conferences interacted. Thepresence of the sub-conferences was characteristic of a conference in which members did not share a common background and had found, within the conference, other members with comparable interests,creating two cliques within the conferences. The simplical complex Q-graphs (membership) showed that, at least inregard to group composition, the two homogeneously grouped conferences and the two heterogeneously grouped conferences were structurally comparable.

The same could not be said for the task-type Q-graphs. The Q-graphs for conferences one (Figure 5) and eleven (Figure 6) were not structurally similar. Conference one, which had a low centrality rating, evidenced this in its structure. While several members of the conference did address comments about topics of common interest to other members, there were no interactions, with one exception, between the three topic streams. It was as if the conferees knew what the otherconferees thought, made their point, and moved on: what one would expect in a homogeneous conference. The opposite was true with conference eleven. The Q-graph showed a completely different structure. The structure of conference eleven was one where the members were connected, one where members interacted with each other frequently, and one where members talked about a variety of topics

with other conferees. Simply, it was more like a conference where the members had to explore a variety of options without knowing what the other conferees believed, even though they had a comparable background.

The same pattern emerged in the heterogeneous conferences: eight (Figure 7) and twelve (Figure 4). Conference twelve's Q-graph was what one would expect from a conference whose task was ill-defined: two separate conferences with little or no interaction between the two. However, conference eight, displayed a great deal of interaction among conferees; and, with the exception of one member, all members of the conference discussed three topics with one topic central to all. Thus, conference eight, instead of fragmenting and discussing a variety of topics, focused its discussion upon a few topics on which the majority of its members centered their efforts.

The structure of the simplical complex (conference composition) Q-graphs was what was expected; however, the conjugate simplical complexes (task-type) were not. Two of the conferences, eight (Figure 4.7) and eleven (Figure 4.8), displayed conjugate simplex structures that were atypical for their task-type. Conference eight's topic type was ill-defined while conference eleven's topic type was well-defined; but the two conferences displayed a comparable Q-graph structure. In each conference a single topic served as the focal point for the discussion and all but one member of each conference engaged in the discussion.

Discussion

The purpose of this research was to investigate the effect of group membership and task-type upon individual productivity within a computer-mediated conference. Each conference consisted of approximately five members and was organized into either a homogeneous conference or heterogeneous conference based on standardized achievement scores. In addition, the conferences were assigned either a well-defined topic or an ill-defined topic to discuss. Individual productivity was measured by six variables.

Centrality, a measure of how connected conference members are with other conferees, was used to rank the conferences. It would be expected that a higher degree of centrality to exist within conferences that were heterogeneous and ill-defined as conferees would have to expend more effort exploring other participant's views on a topic for which there was no correct response and, to a degree, this was the case. Of the three highest ranked centrality conferences, two were assigned an ill-defined topic; however, two of three high-centrality conferences represented homogenous composition.

Four conferences were identified for further analysis: twowith a relatively high centrality rating and two with arelatively low centrality rating. Within each pair, there was a conference that did not exhibit expected results. For example, conference eleven, a homogeneous well-defined conference, displayed results more typical of a heterogeneous ill-defined conference, and conference eight, a heterogeneous ill-defined conference, displayed results more like a homogeneous well-defined conference.

The effect of task-type and group composition on individual productivity was explored further by using two measures of structural analysis. First, a Q-analysis was conducted on the four selected conferences, two well-defined task-type conferences and two ill-defined task-type conferences.

The first Q-graph was of the simplical complexes (composition). The graphs of the heterogeneous ill-defined conferences were comparable as well as those of he homogeneous well-defined conferences. The graphs indicated that when the structure of the conferences was drawn, the conferences were structurally comparable. Thus, it was possible to dismiss the effect of group composition upon individual productivity, leaving task-type as the influence upon individual productivity within the conferences.

This study has relevance for the classroom and more specifically for instructional design. With the expansion of computer-mediated communication opportunities, students have theopportunity to participate in conferences with other students at sites temporally and physically separated from their

own. One aspect of computer-mediated conferencing inhibiting teachers from taking advantage of this tool is time. There is no question that computer-mediated conferences take longer to accomplish a task than do face-to-face groups; but, if it were possible to identify specific variables, such as the type of tasks assigned to a conference, such concerns may be lessened. This study has provided some evidence that task-type does have an influence upon individual productivity within a computer-mediated conference.

References

Ahern, T.C. & Durrington, V. (1995). Effects of anonymity and group saliency on participation and interaction in a computer-mediated small-group discussion. Journal of Research on Computing in Education, 28, 133-147.

Atkin, R.H. (1974). Mathematical structure in human affairs.

London: Heinemann Educational Books.

Chapanis, A. (1988). Interactive human communication. In I.

Greif (Ed.) Computer-supported cooperative work: A book of readings (pp. 127-140). San Mateo, CA: Morgan Kaufman.

Freeman, L.C. (1978). Centrality in social networks:

Conceptual clarification. Social Net.

[TOP]

Hardware/Software to Support Distance Learning Classes

Bruce Harrison, Jr.

- Abtract
- Introduction
- Electronic Mail
- Electronic Mailing Lists
- Computer Conferencing
- World Wide Web Services
- Audio and Video Via the Internet
- Other Internet Services
- Telephone-Based Technology
- Problems to Consider
- Conclusion

Abstract

While the major part of any class is the classroom contact time, out-of-class support often makes the difference between success and failure of a student. With Distance Learning classes, we are faced with a unique set of problems in supplying this outside support. Our students are often spread over large geographical areas and have varying schedules due to work and family considerations. In order to overcome these problems, there is a wide array of hardware and software tools at our disposal. We will explore such tools as electronic mail, World Wide Web servers, computer conferencing software, voice/telephone technology, and Internet services such chat, audio, and video.

Introduction

Outside support of a traditional class includes office hours for the instructor, review sessions, notes posted on a bulletin board, extra handouts available from the office secretary, peer-led study sessions, and classroom note-sharing among students. When everyone was normally in the same geographical location and had some time during the week to meet with others, it was fairly easy to interact and/or get help with classroom work. With the advent of technology based distance learning, our classes are now spread over a wide geographical area and contain non-traditional students with diverse schedules. Now our task of supplying and encouraging this outside support becomes much more difficult. How do you hold a review session for 25 people separated by 100 or more miles, and who may be working unusual schedules? What about the people away on a business trip? How do students share notes and ideas outside of class? How can these students ask questions of the instructor and get a timely answer? What about help with working a math problem or checking a circuit diagram? Hopefully, the technology that caused some of these problems can also help solve these same problems. I would like for us to take a look at some of this technology and apply it to the above concerns.

Electronic Mail

Our first tool is a familiar one, electronic mail (E-mail). You may already have E-mail access, but if not, get an E-mail address, learn how to read your E-mail, and acquire the habit of reading it at least once a day (hopefully more). Having done this, be sure your E-mail address is listed in the class syllabus and is well-known to the students. At the beginning of class request the E-mail addresses of all students. These can be incorporated into a nickname or list in your E-mail software, making it quite easy to send E-mail to the entire class. Some instructors distribute the syllabus via E-mail, and even require homework to be submitted using E-mail. Encourage your students to become familiar with and use E-mail; perhaps even require its use.

E-mail is the probably one of our "lower-tech" solutions. As long as someone has access, they can be using an older computer, or even a terminal attached to a company mainframe. The drawback is that E-mail is a text-only medium. It is possible to attach a word processor document (or other files such as a spreadsheet) to an E-mail message. The student then reads the E-mail, saves the attachment, and opens the attachment using applicable software.

Electronic Mailing Lists

If the class is fairly large, maintaining an up-to-date list of all E-mail addresses can be a problem. In addition, each person in the class must maintain that same list. A better solution is to use some version of list processing software (listserv, listproc, majordomo, etc.) and to set up a mailing list for the class. In this scenario, an electronic list is created and everyone in the class subscribes to this list. When E-mail is sent to the list, it is automatically forwarded to all subscribers on that list. With this tool, only one copy of all E-mail addresses is required. Normally you, as the owner of the list, control who is on the list. People are added or deleted from the list as required. With list processing software, it is possible to maintain an archive of all E-mail sent via the list. This is useful for students wishing to catch up after an absence. Most list processors also allow the storing of files and their subsequent retrieval by list members.

If E-mail is to be an integral part of your class, I recommend using a list. This effectively deals with the problem of various schedules. Class members may read their E-mail from the list whenever they choose and reply at their leisure. Group discussion takes place without the entire group being present at any one time. In addition, a list best addresses the problem of maintaining a single, manageable list of all E-mail addresses.

Computer Conferencing

Computer conferencing is a software tool that allows multiple people to participate in a group discussion, exchanging text, images and sound in real time. This software requires all participants to have computers capable of running the conferencing software and be connected to the internet. The Internet connection can be via a LAN or dialup , but must be a network connection. Simple asynchronous dialup to a mainframe or other central computer is not enough. Using this software, it is possible to schedule an online classroom discussion without regard to location of the participants. Any computer on the internet and running the conferencing software may participate.

There is a particularly nice software package available via the Internet and it is free. The software "PowWow" is available from http://www.tribal.com and is suitable for both small and large conferences. It supports text, images, and sound. The only drawback is lack of Macintosh support. There are many commercial products available and should be surveyed for suitability and cost if you plan to do extensive computer conferencing.

If the majority of your students only have asynchronous access, there are several mainframe or central computer based conferencing packages on the market. You may want to

inquire with your computer services group on campus as to availability. These packages are normally text-only, but on the other hand they can be used in an older computers or terminal environment. In summary, the PC-based conferencing packages offer much more functionality, but require a higher level of hardware and network connection. Central computer based conferencing packages require a lower level of hardware and network complexity, but are text-only.

World Wide Web Services

Perhaps one of the best known tools at our disposal is the World Wide Web (or WWW) server. This tool is especially suited for posting such information as course syllabus, class notes, extra study material, links to other material on the internet, etc. In addition, files such as word processing documents and spreadsheets may be stored on the server and downloaded by students at their leisure. The WWW server excels as a way to make graphic images such as drawings or photographs available. Even audio files and video clips may be incorporated. To make full use of information on a WWW server, the student must have access directly to the Internet and be using a computer capable of running the newer WWW browsers such as Netscape or Internet Explorer.. A large investment in learning and preparation is required of the creator of these pages. There are tools available to aid in the creation of these pages, but it is still no trivial matter. With that said, the WWW server remains one of our best tools for making information available to a widespread audience. In addition, it is possible to use message boards and allow group discussion very similar to what takes place on an E-mail list.

Audio and Video Via The Internet

With today s technology, it is possible to record and store audio and video as computer files. These files can then be accessed from a WWW server or downloaded and played back later. This technology may have use with a music class to make listening examples available or for other classes to provide demonstrations. Video and audio files can be quite large and thus have long download times. Class members must also have sufficient computer resources to retrieve and play these files.

Audio files can be recorded with any computer equipped with a sound card. Video recording requires a special piece of hardware known as a video capture card. Input to this capture card can be a camcorder, VCR, or other video source. When dealing with video and audio recordings, copyright issues must be addressed. If the material is of your own creation, you may use it as you wish. If the material belongs to someone else, the question of copyrights comes into play. Often your library can provide information on this subject.

Another area involving audio and the Internet is the ability to broadcast audio. This can be pre-recorded or live audio. In this situation the audio is not stored on a computer but is put out on the Internet in real time. The broadcast is done by a special server and is received by special software. Two of the systems to do this live audio broadcast are RealAudio and Mbone. Check out http://www.realaudio.com and http://www.mbone.com for more information on either of these products. Using this technology it would be possible to make a live speaker available to a dispersed group with little effort. Students could hear a speech or presentation without being on campus.

Video teleconferencing via the Internet is another area that may have potential. Using a personal computer equipped with a video capture card, sound card, and software, it is possible to hold a live video/audio conference over the internet. While this is an exciting tool, it requires a large amount of bandwidth and fast network response time to be useful. If the Internet itself is slow during a conference, the user sees this as a frozen picture or gaps in the audio. "CuSeeMe" is probably the best known of the Internet video teleconferencing systems. Further information

can be obtained on this software from http://goliath.wpine.com/cu-seeme.html or http://gated.cornell.edu/pub/video/. For other software, use one of the search engines on the Internet and look for "video teleconferencing".

Other Internet Services - Chat, MOO, MUD, and WWW Broadcast

Another tool, similar to computer conferencing and WWW message boards, is IRC, or InterRelay Chat. This is a live, interactive, text-only discussion system. A chat server allows you to create various channels and to hold a discussion. The channel may be local to that server or connected via other servers to form a world-wide discussion. If students only have access to asynchronous dial-in and accounts on a central computer, chat can still be used via a chat client on that central computer. Others may participate via direct internet connections and clients on their individual computers. Check with your computer services group on your campus, a chat server may already be in place.

MOO s and MUD s, software that had its origins in the role-playing game arena, have been used in an educational setting to provide a gathering place for people to discuss and interact. The software creates various virtual rooms"; the participants can enter or leave a room, and once in a room interact with others there. Private conversations are also possible. A MOO or MUD server is required to create this environment. For an example of MOO s and MUD s used in an educational setting, check out http://www.missouri.edu/~moo/ which is the University of Missouri s Educational MOO. Also of interest may be the paper shown at http://sensemedia.net/sprawl/16880 which is entitled MUD s in Education: New Environments, New Pedagogies.

A new and emerging technology that may be of interest to the distance learning community is on-line content-delivery servers. These servers broadcast information over specified channels on the internet. The user receives this information via a special server software package or one of the newer Internet browsers. Currently the best example of this technology is PoingCast, but there are others in the market. Check out http://www.pointcast.com http://www.backweb.com http://www.intermind.com or http://www.netdelivery.com.

Telephone Based Technology

The telephone has become a standard fixture in our society and a number of information tools have sprung up around it. Answering machine and voice mail can be obtained quite easily and can be used to make information available 24 hours a day, and requires nothing other than a standard touch-tone telephone to use. Customized voice mail systems could be used to disseminate information on a number of classes. Telephone access to data on a mainframe or networked computer system is also available. Students can register for classes, check information, pay fees, etc. without having to travel to campus. While this is not strictly a teaching issue, it makes the entire educational process much easier and user-friendly.

Conferencing via telephone may be a useful classroom tool. Most campus telephone switches can establish a multi-way telephone conference. However, these may be limited in number. The local telephone company can also provide a dial-in conferencing service to accommodate many more callers. It would be possible to hold a review or discussion session among all class members over the telephone.

Fax services can be of use to the distance learning environment. Besides the normal fax machine, there are fax servers where a user may call in and request a specific document be faxed

to them. It would be possible to distribute class information and handouts via this method.

Problems to Consider

With all of our modern technology and global connections come a few problems. Several points need to be considered.

Availability of appropriate hardware and software for all students and instructors
Access control to keep outsiders from disrupting class discussions
Availability of internet access for all students
Copyright issues for audio, video, and printed material
Training students and instructors in the use of various software packages
Cost of acquisition and use of appropriate technology

Conclusion

A large and ever-growing collection of technology is now available, allowing us to better serve our students who may be geographically spread about our service area. With this new technology we can make it much easier for students to retrieve information, participate in out-of-class discussion and to maintain close contact with the instructor. This can often be done from the convenience of their home or office with no more than a modern pc and an internet connection.

[TOP]

Breaking the Vicious Circle: Getting Faculty and Technology Together

Glenn S. Everett

Please excuse me if I seem at first to be repeating some commonplaces with which you are all familiar. My intent is to try to relate here the thinking which went into developing the Faculty Multimedia Center at the University of Tennessee at Martin, and the role we see it playing.

Consider what was faced by faculty members at UTM a few years ago who were studying whether to use computer-based technology as part of their courses: the computers in our offices were not powerful enough to experiment with this technology, and we had no other place to go except the student computer labs. If we did manage to develop something, only a few large classrooms had any projection equipment, and it was not intended to connect to computers. If we developed something for out-of-classroom use by students, there were problems there as well: our computer labs were crowded, and lacking computer classrooms, we were holding some classes in the labs, further reducing student access to them. And of course the labs are not upgraded as often as they should be. Finally, not only were incentives to faculty members developing instructional aids completely lacking, there were on the contrary powerful disincentives.

So: no computers on which to develop technology; no laboratory in which to house the computers; no way to transfer any teaching aids developed elsewhere to the faculty office computers; no way to use such aids in the classroom, and inadequate student access to them outside class; no incentive for faculty members to spend precious time developing the resources which would require upgrading computers university wide for both students and professors; and little money to attack any of these problems. It was a perfect vicious circle, which I believe that UTM is in the process of breaking, and in the most economical way.

Those of us gathered at this conference do not need to be sold on the potential importance of instructional technology, nor on the impact that it may have on teaching and learning in the future. During this last decade of the second millennium, computer technology has leapfrogged far ahead of itself. It has done that before; but finally we are approaching the point at which computer-based multimedia might be becoming a realistic possibility, both financially and practically, as something that "ordinary" (non-technologically-minded) faculty can develop, in a way that can make a real difference for in-and-out-of-the-classroom instruction.

We know also that students need to be educated in the ways that computers may change their lives; but at the moment, virtually all computing courses which address these technologies are "how to courses: training in particular methods, usually restricted to specific fields of study. There is almost no attempt to address the what or the why; that is, to discover which technologies work best with traditional educational goals, or to see if there are goals we can now reach with these technologies which were unreachable before. More important, neither the implications of the technology for education nor the larger issues of the social changes which may be wrought by it are being addressed.

Why not? Well, who is to teach them?

To use UTM as an example: we have never had the luxuries that huge endowments or lucrative research grants bring to expensive private colleges or big public research institutions, and our faculty teach more courses and more students than our colleagues at those schools. Neither do we have the research capabilities or administrative staff of a major research institution. We can not afford to commit time and money to experimentation with unproven teaching aids. Because we also teach a four-course per semester load, there is little time to experiment with new techniques unless they can be implemented

with no increase in course preparation time. Rarely, then, will you see our faculty experimenting with technology just for experimentation's sake.

True, new faculty just coming out of graduate school have had available to them some of the newer technological resources and some opportunity to think through their pedagogic goals and methods of approach at the same time that they are experimenting with the technology; but think for a moment of the powerful disincentives for experienced faculty, especially at state-funded, primarily undergraduate institutions like UTM, to experiment with unproven teaching aids--even for the most inspired, creative faculty. The kind of teachers that I'm talking about have always sought ways to bring their subjects alive, and to motivate students to become learners. By definition, if they are experienced, they have long ago thought carefully about their educational goals and have, over the years, developed methods--again, by my definition, successful ones--to reach them. We all have a finite amount of time and energy, and there is an inverse relationship between the amount of time we must spend on the day-today business of teaching our courses and the degree of innovation we can bring into our interaction with students.

In the absence of reasonable incentives to change the way they teach, these most experienced teachers are entirely justified in avoiding the new technologies in favor of the methods they are already using successfully. Yet if we believe that computers and computer-aided technology have become centrally important to the college experience for every student, we cannot afford to have our best teachers ignore this resource, nor can we wait for them to retire before the new technology is put to use. Neither is it acceptable for students to encounter computer technology only in one or two computer science courses: that would send the message that computers may safely be ignored if your primary interests lie in a field that has not, traditionally, been technologically oriented.

It is entirely likely, then, that a college's administration may become convinced of the desirability of incorporating new technology in its curriculum before its faculty is prepared to make this change, and the administration at UTM is (mostly) convinced. Our chancellor, Margaret Perry, said in a recent interview when asked about her vision of UTM's future, "The vision now is based on where technology will take us. I can't quite visualize it, because we don't know where some of this is leading. In the midst of building a faculty that cares, in comes this rush of technology. Because it's there and because we all know it is the future, we have to find a way to tie the two together" (Kanavel).

An early recognition of the necessity of change came in a proposal by Dean Robert Smith of the School of Arts and Sciences for a new faculty laboratory. If our students are to remain competitive, he argued, "nothing less than a complete redesign of our approach to education is acceptable. First, our faculty must have access to the technology that shapes this revolution and have the time and support to learn how to use it. Second, our students must be oriented to technology and have experience that builds their confidence and leadership, expands their creativity, and develops their analytical skills....UT Martin proposes a complete redesign of teaching on the campus where teaching is our first priority. The transformation will be lead by the faculty and will build on their commitment and dedication to our students. This revolution will require providing three major components: (1) a multimedia technology laboratory where faculty can develop advanced state-of-the-art instructional methods; (2) high-tech classrooms where instruction can be enhanced using advanced technology to bring the latest information and instructional technology into the everyday lives of our students; and (3) a high-tech educational network to provide communities and businesses throughout West Tennessee access to research, seek innovative answers to problems, and stay in touch with the global marketplace (Smith).

So the administration had begun to recognize this necessity; in practical terms, the process began when an outside donor was found who would entirely fund what has become the Faculty Multimedia Center.

But it was clear that the hardware and the laboratory were only the first step. Who was . to staff the lab? Kendall Blanchard, Vice Chancellor for Academic Affairs, announced a competition for an Academic Affairs Faculty Fellow, who was to be responsible for the center on a half-time basis: the first Fellow turned out to be yours truly. Dean Smith had already developed certain specifications for the design of the room and some of the basic computer hardware, but for the first five months of my appointment, most of what I did was research computer capabilities, check prices, and vendors, and discuss what we wanted with the dean and faculty. The Center currently has the following equipment:

- seven IBM Aptivas and five Macintosh model 9500 multimedia computers, all with 17-inch monitors;
- another six 17-inch "common" monitors which display what is on the "instructor's" IBM or Mac--or any other computer in the room, using Timbuktu software;
- a fileserver running Novell Netware on which faculty members have accounts;
- a Hewlett-Packard 4c Scanner;
- a Yamaha CDR-100 Compact Disk Recorder running Astarte Toast software;
- a Miro DC-20 Video Capture Board;
- Sound capture capability on every computer in the room;
- an S-VHS recorder and TV;
- a Connectix Quick Cam;
- a Hewlett-Packard ColorJet printer/copier;
- a LaserJet printer.

Then, in order to interest faculty in this initiative, Dr. Blanchard found the money to set up a couple of week-long summer workshops, which I would run.

I thought it fundamentally important, when we solicited proposals from the faculty, that we not ask them to describe how they could employ this technology, but rather to think about things they wanted to accomplish in the classroom, or skills and approaches that they wanted their students to master -- a much more difficult and abstract question. To quote from the actual announcement: "Our intent is not simply to inject a technological component into the course syllabi, but to provide an opportunity to faculty in all disciplines to re-think their teaching goals. Computer technology has advanced so far so quickly that many of the things you might once have wanted to try with your students , but which you rejected as too time-consuming, may now be possible. Also, once you see what others are doing, you may get some ideas about (1) new and better ways to deliver your course content, (2) new ways of interacting with students (or getting students to interact with each other), or (3) new ways for students to learn critical thinking skills relevant to your discipline. Perhaps you will find that you can relegate some less directly important tasks to the computer, thereby freeing up time for more face-to-face interaction with students. You don't need to be a computer expert -- quite the contrary: we are actively seeking faculty who have made made much use of this technology so far. We are less interested in how technologically sophisticated your proposal is, and more in how well it is thought out pedagogically. What we are hoping is that you can start with a clean slate, and ask how you would like to communicate the material and methods of your discipline to your student; perhaps an even better question to ask is, what is the best way for students to approach the material?

Happily, we got so many good responses, from every school and division on campus, that Dr. Blanchard authorized three workshops instead of the two that we had planned.

The proposals included

- a tutorial on the creative potential of photographic light;
- an exploration of ways to demonstrate the relationship between creativity, style, and repertoire in an aesthetics class;
- an investigation of ways to use CD-rom materials to display pictures, paintings, charts, graphs, even musical and video segments in a history class;
- an exploration of internet technology applied to a distance learning class;
- video demonstrations of things in a chemistry lab that can't be done live;
- an on-line Encyclopedia of Philosophy;
- exploration of the potential of videoconferencing technology to supervise nurs ing students making home visits;
- creation of multimedia applications for the study of the age of Louis XVI;
- multimedia introductions to choral works;
- the use of animation in presenting information in an accounting classroom;
- two separate proposals to explore the internet's potential for interchange among students and teachers, using e-mail and bulletin boards.

In short, we saw that, given the time and place in which to experiment, our faculty jumped at the chance.

At this point it was really up to me to demonstrate the usefulness and some of the capabilities of this technology. At a faculty forum I tried to do this by showing the familiar problems with the technology of the recent past--slide projectors, phonographs, and vcrs--and gave some indication of how much more flexible computer-based technology promises to be. I also tried to indicate some of the things which this technology makes possible which previously could not be done in the classroom.

Demonstrating the problems was easy. Those of us who have tried to use multiple media in the classroom know how difficult it is to haul in and set up slide projectors, record players, vcrs. And to use more than one medium per day is just about unthinkable, unless you have a lot more student assistants that we do.

Suppose I want to show my students,what Keats, Browning, Ruskin--any of the writers inspired by works of art--were reacting to. If I lug in the books containing those art works, I can then either try to show them to the first few rows of students, or pass them around--neither option very satisfactory.

Suppose I'm teaching Browning's "Andrea del Sarto," in which the character makes frequent comparison between his skills and Raphael's; we ought to look at some of the paintings Browning is talking about, shouldn't we? But have you tried to carry around a good, large-format art book? I can, if I have enough time, use slides; that is, I have to get slides made, set up the slide tray, carry in the slide projector and the table, get them both set up, douse the lights for the slide show (and hope that the class doesn't go to sleep), and then at the end of the period I have to get it all taken apart before the next class shows up at the door.

If I want them to hear Yeats or Dylan Thomas reading from their works, it's almost as bad. I have to cart in the tape recorder and the record player, cue up the tapes and the records, and pay much more attention to the mechanics of playing the device than to the class I am supposedly teaching.

Videotape? fine--if and only if I "teach" to the convenience of the VCR. When I teach Shakespeare I would like to compare a couple of scenes in the Hamlets of Gielgud, Olivier, Barrymore, and Mel Gibson. The only way a teacher has been able to do this is to assemble all the videotapes, cue them up to the one scene that we want to show, and then switch them in and out of the VCR--for that one scene only, after which you have to set everything up again. Lord forbid that you have two sections of the same course back-to-back. Very clumsy, and very distracting.

All of the previous options are time-consuming and inconvenient, and can distract the students from the points I am trying to make about the works. Notice, however, that the objections to using these materials have NOTHING to do with the pedagogical usefulness of these materials; the limitations are strictly practical.

One great advantage of computers as multimedia devices is their flexibility, the way they can be made to do so many different things. Just to run through the different media available on the Web: There are already many artworks on the web--the Virtual Louvre and the Christusrex sites are probably the most famous. Given access to a scanner and a Web server, however, it is faster to put images on the web for students to look at in a computer lab than it is to get slides made. Somewhat fewer computers have sound capability, but as they become more available, students can hear poets like Seamus Heaney reading their poems (http://sunsite.unc.edu/dykki/poetry/home.html), and we can also make our own CDs--for example, one I have made of our UTM choral group.

People are also making available over the Web some multimedia resources which have been previously restricted to local use. Two cases in point are George P. Landow's Victorian Web at Brown University (http: llwww. stg . brown. edu/projects/hypertext/landow/victorian/victov . html), formerly on Storyspace, and a Macintosh Hypercard stack of William Blake's Songs of Innocence and of Experience, put together by Stephen Marx at Cal Poly. An example of a multimedia project designed specifically for the Web is this one in which I have been involving my upperdivision students: a hypermedia edition of

those dramatic monologues by Robert Browning in which he has painters like Fra Lippo Lippi and Andrea del Sarto discuss their works, rather specifically, in competition with those of other painters (see http: llwww . utm. edu/departments/english/everett/rb . shtml) .

One very exciting advance is in what the multimedia computer and the Web have made possible in terms of film commentary. Consider what the film critic used to have to do as recently as 2 years ago. When he wanted to talk about film technique, he had to attempt to describe what happens with the camerawork, and you had to use either your memory or your imagination to try to ascertain whether the technique in the films mentioned actually supports the argument made.

Now for the first time, the computer makes it possible to quote film-- and this is what Robert Kolker has done in an essay which could be published no other way (Kolker). Professor Kolker wants to talk about the way Alfred Hitchcock influenced the technique of directors like Martin Scorsese and Stephen Spielberg; and how could he show that? Now he can. His article includes still photographs from the different movies he is comparing; and when you click on any one of them, you bring up a clip from the movie, showing the way the camera moves and the sequence of shots the director has chosen. What he has done with these movies, we will be able to do with any performances that exist on film or videotape.

Perhaps even more pedagogically useful than multimedia presentations is the potential for interactive communication over the computer. I began this semester testing "Virtual Fridays," where we hold discussions on line rather than in the classroom (see http: / Iwww.utm. edu/cgibin/caldwell/bubba/aaff/bubl 1224 or http: //www.utm.edu/cgibin/caldwell/bubba/aaff/bub465). So far, I am extremely pleased with the results; this medium seems to encourage out-of-class thinking about ideas presented in class--and requires 100% student participation in the discussion.

What is new and different about this technology is that it is under the control of the user (that is, the teacher) and is a hands-on medium. Take, for example, video. In its current incarnation, videotape, a teacher's interaction with it must be primarily passive: you turn it on and let it run. At the end of the tape, you wake up the class and try to hold some discussion of what they saw. With video captured to a computer hard disk or DVD disk, the teacher can quickly select exactly those moments from a video which illustrate the points under discussion in class. The teacher retains control over the material rathe

Master Classrooms at Middle Tennessee State University: Creating Pathways for Learning

Gina Roberts

Sylvia Brace, Ed.S.

Donna Smith

- Abstract
- What is a Master Classroom?
- Master Classroom Advantages
- Master Classrooms at MTSU
- Room Renovation and Development
- Master Classroom Equipment
- Master Classroom Uses
- Master Classrooms and Network Connections
- Training and Support
- Maintenance and Upgrades
- Evaluations
- Master Classroom Challenges
- The Future of Master Classrooms

Abstract

Students and faculty at MTSU are continuing to explore new ways of teaching and learning in master classrooms. Master classrooms are specially equipped classrooms that contain a wide range of computer, media, projection, communication, and control capabilities; including connection to the campus network. Master classrooms typically contain one computer which can be used by instructors and students for presentations, simulations, on-line access and multimedia.

This paper contains information on the development and implementation of master classrooms. Topics include planning for rooms, renovating and developing rooms, purchasing equipment, utilizing the rooms, training and supporting faculty, maintaining and upgrading equipment, conducting evaluations and implementing suggestions, and planning for the future.

Students and faculty at Middle Tennessee State University are exploring new ways of teaching and learning. Specially equipped classrooms, called "master classrooms" combine powerful computing, effective display, and the wealth of information available through networks to provide a more flexible and exciting learning environment that accommodates different teaching and learning styles. Studies show that students tend to retain more as well as learn faster if they see, hear, and interact during the learning process. Master classrooms help provide these pathways for learning.

What is a Master Classroom?

Kathryn Conway from the University of North Carolina at Chapel Hill defines a master classroom as a specially-equipped classroom that provides a wide range of computer, media, projection,

communication, and control capabilities, including connection to the campus network. The master classroom differs from a computer classroom in that it usually does not have individual computers for each student, but rather has a single computer that can be used by an instructor or students for presentations, simulations, on-line access, and multimedia.

Master Classroom Advantages

The most obvious advantage to using a master classroom is the availability of computer, media, and communication technologies. These technologies enable instructors to enhance their different teaching styles as well as to reach students with different learning styles. In a master classroom the equipment is permanently installed and is operated in a consistent manner from classroom to classroom.

Master Classrooms at MTSU

MTSU's Office of Information Technology (OIT) initiated the master classroom project on campus and directed its implementation and development. Planning of the first six master classrooms at MTSU proceeded with support from both administration and faculty. Funds were allocated for equipment, software, and room preparation, as well as for faculty training and grants. Master classroom committees were formed in each college of the University to work with OIT to identify the equipment and software that would best meet the college's needs, as well as to choose the location of the master classroom for that college.

Additional master classrooms continue to de developed with individual departments contributing to their design and funding. As of January 1997, MTSU has eleven master classrooms located throughout the campus with room capacities ranging from 30 - 110. The average cost of the equipment and room renovations has been $30,000-$35,000 per master classroom. OIT continues to administer and support the master classrooms and provides training for faculty, technical support, and maintenance.

Room Renovation and Development

Designing the master classrooms requires consideration of elements such as heating, cooling, power supply, lighting, acoustics, security, networking, furniture, fixtures, and equipment. The following alterations and enhancements are made to prepare classrooms to become MTSU master classrooms:

dimmable lighting is added with controls near the instructor's station and door;

chalkboards are replaced with whiteboards;

power outlets are added;

a projection panel or motorized projection screen is mounted on the front wall;

blinds or blackout shades are added to the windows;

walls are repaired and painted, floors are carpeted;

and special furnishings are installed such as an instructor's station and equipment cabinet.

Master Classroom Equipment

MTSU's master classrooms contain a wide variety of audio/visual media for use by faculty and students. The typical room consists of the following basic equipment: A teacher's station in the front of the room that houses a multimedia PC or Power Macintosh. These computers are loaded with productivity, authoring, presentation and communications software and have access to the campus network and the Internet.

A visual presenter is mounted on the desktop of the teacher's station. It is used to view documents,

3-dimensional objects, transparencies and slides. An equipment cabinet holds a laser disc player, videocassette recorder, and audio receiver. Signals from the visual sources are projected on a screen at the front of the room via a multiscan video/data projector. Television monitors and speakers are also mounted at the front of the room. Each of these components, along with the lighting system, are controlled by the faculty member through a single remote control.

In addition to this basic equipment, each room is customized to fit a department's needs.

Master Classroom Uses

The uses of a master classroom are practically unlimited. Faculty may use commercially developed instructional materials in the form of videotapes, laserdiscs, 35mm slides, computer diskettes, CD-ROMs, audio CDs, and audio cassettes. They can also develop materials themselves.

Many classroom applications can be derived from word processing, spreadsheet, statistical, database, presentation, and authoring software. An English professor may use a word processing package to demonstrate sentence structure, or an accounting professor may use spreadsheet software to show students how to calculate annuities. Presentation software can be used to organize and present lecture notes, which can easily be enhanced with templates, clip art, and symbols. A biology professor may use multimedia authoring software to create an application that incorporates animation, still photos, and movies to demonstrate the stages of mitosis. Utilization of these programs enables faculty to spend class time facing the students rather than the chalkboard. It can also increase the lecture's organization and legibility.

Master Classrooms and Network Connections

Having access to MTSU's campus network and the Internet allows faculty to connect to a wealth of content-related information and to demonstrate networks for students. Within the campus network, faculty can demonstrate how to use e-mail, search for information in the campus library, or retrieve files from other computers on campus. They can demonstrate how to use network tools such as Telnet, FTP, Gopher, and the World Wide Web.

The instructional possibilities of the Internet are endless. Examples include an aerospace professor displaying for a weather class satellite images of the earth's atmosphere photographed only an hour or so before class; a political science instructor accessing the President's latest press conference; and a business law class analyzing and discussing up-to-date Supreme Court rulings pulled from the Internet.

Training and Support

Orientations are held every fall semester to introduce new faculty members to the capabilities of the master classrooms. One-on-one sessions are recommended for faculty that are teaching in the rooms. During these one-on-one sessions, faculty are given the chance to operate the equipment and ask questions related to their particular needs in the master classroom. After the semester begins support staff are available if faculty members have a problem during a class or have questions about the capabilities of the room.

OIT also provides instructional technologies development grants, productivity, presentation, authoring, and communications software workshops; and application development assistance in its Digital Media Center to make sure MTSU faculty have the necessary time, training, and support to learn to use software, develop applications, and use technology effectively in the master classrooms.

Maintenance and Upgrades

Regular testing of all master classroom equipment insures its proper operation. Software and hardware are upgraded as needed. Faculty suggestions play a significant part in determining what upgrades are necessary.

Evaluations

Giving faculty and students the opportunity to evaluate the master classrooms every semester enables them to let us know what works well for them and what doesn't. The results are compiled and taken into consideration for training, maintenance, and upgrading of current master classrooms. Suggestions are kept on file as reference material for the construction of new master classrooms.

As of Spring 1997, over 225 different faculty members have taught in master classrooms. Over 100 different faculty members are scheduled in a master classroom each semester. The response has been overwhelmingly positive. Over 90% of the faculty that respond to evaluations want to teach in master classrooms again and would like to see more master classrooms constructed on campus. They provide OIT with excellent suggestions for classroom improvements and upgrades -- many of which have already been implemented.

Currently, over 5,000 students per semester take classes in MTSU's eleven master classrooms. Over 80% of the students surveyed would like to take more classes in them and see more constructed on campus. They site the Internet access in the rooms and the increased visual presentation of course content as two of the main factors.

Master Classroom Challenges

As departments allocate funding for their own individual master classrooms, scheduling and maintenance difficulties increase. Currently there are master classrooms that are reserved for use by specific departments and master classrooms that are open to all departments. Whether a master classroom is for university wide use or department specific use, OIT provides as much support as is needed.

As the numbers of master classrooms increase, OIT will also face the challenge of not having enough personnel to support them. This problem may be addressed by hiring additional personnel or student workers to assist with master classroom support.

The most difficult challenge OIT faces is not having enough master classrooms on campus. As faculty members start teaching in the rooms and developing materials that in many cases can only be used in master classrooms, they want to be able to teach all their courses in master classrooms. Of course, this is not possible at this time. OIT's only course of action is to encourage individual departments and colleges to continue to develop master classrooms and to seek grant funding for the construction of campus wide master classrooms.

One solution to the problem of not having enough master classrooms on campus is the development of more multimedia carts. Multimedia carts contain equipment such as LCD projectors, PowerMacintosh or Pentium computers, visual presenters, VCRs, laserdisc players, and CD-ROM players. This is a much less expensive solution and is also practical for rooms that are not large enough to be converted to master classrooms. Master classroom faculty and faculty using teaching materials developed by master classroom faculty can take advantage of the availability of technology-based teaching materials with these "portable master classrooms". Several departments on campus are currently using multimedia carts.

The Future of Master Classrooms

At least one new master classroom will be constructed over the summer bringing the total to twelve classrooms on MTSU's campus. The Business/Aerospace building, slated for completion during the fall 1996 semester, will contain 40-44 modified master classrooms. Our goal is to continue to encourage and support the development of master classrooms so that one day every classroom will be a master classroom.

[TOP]

Meeting Faculty Needs for Training in Instructional Technology: The Academic Technology Lab at ETSU

Delbert L. Hall, Ph.D.

- Abstract
- Paper

Abstract

As we approach the 21st century, faculty members at colleges and universities are looking at how technology can improve teaching. As new tools and means of instruction are developed, faculty members must learn how to use these high-tech innovations. To help faculty understand and implement technology into their teaching methods, East Tennessee State University created the Academic Technology Lab. This paper discusses the development of this facility, its training programs, and faculty reaction.

In 1994, East Tennessee State University decided to convert five of its traditional teaching auditoriums into "state-of-the-art" multimedia auditoriums. When these newly renovated auditoriums went into use in August of 1994, they were equipped with a multi-preset lighting system, a video projector, a computer, a visual presenter, a laser disc player, a VCR, a video slide projector, wireless and podium microphones, an integrated sound system, and a remote control panel which allowed the instructor to control the equipment from anywhere in the room. Despite all of the preparation that went into the design of these rooms, no plans were made for training faculty members in using the equipment.

Soon after classes began in the fall of 1994, faculty who taught in these auditoriums began experiencing problems. Four of these five auditoriums were located in classroom buildings principally used by the College of Arts and Sciences. Therefore, the dean's office was soon overwhelmed by complaints from numerous departments within the college. Fortunately, two faculty members of the Department of Communication, Drs. Dan Brown and Delbert Hall, had experience in teaching large classes and the use of multimedia equipment. The Center for Multimedia Development was created to train faculty members in how to operate the equipment in the multimedia auditoriums and to diagnose equipment problems. Over the next year, Brown and Hall, through the Center for Multimedia Development, offered several different "workshops" on multimedia. The most popular was on using Microsoft PowerPoint for creating lectures.

Because the Center for Multimedia Development did not have a training facility these "workshops" were more like demonstrations with accompanying handouts. By August 1995, Brown and Hall had concluded that there was enough demand by faculty for training in multimedia to warrant the creation of a training facility. A meeting was set up with Dr. Bert Bach, Vice President for Academic Affairs; Dr. Don Johnson, Interim Dean of the College of Arts and Sciences; and Dr. Norma MacRae, Director of the Teaching and Learning Center. After listening to the request, Dr. Bach agreed to fund a three-phase project that would provide computers and other equipment for a faculty training facility. The College of Arts and Sciences provided the space for the facility and fifty percent release time for a faculty member to manage the facility. The equipment would be on the inventory of the Teaching and Learning Center but would be managed by the Center for Multimedia Development. This training facility would be

known as the Academic Technology Lab.

By fall 1996, the new electrical service had been installed, the network connections were run, and six workstations and an instructor's computer were in place. The room was also equipped with a flatbed scanner, a visual presenter, a VCR, and a video projector. On August 13, 1996, the Academic Technology Lab at ETSU became a reality.

The mission of the Academic Technology Lab (ATL) is to "provide faculty members and graduate teaching assistants with training and resource facilities for using technology in the classroom." The ATL provides faculty with knowledge and training to enhance their teaching potential and is a resource center with specialized instruction, hardware, and software for faculty and teaching assistants to use in preparing lectures or other instructional materials.

The original mission statement called for the ATL to conduct at least three workshops per week, but from opening day, it was clear that the demand for training in instructional technology was going to exceed expectations and resources. Within four days of the first workshop schedule being announced, all seats were reserved and a long waiting list was created. In the brief time it has been opened, more than 200 faculty and staff members from 82 departments have taken workshops at the ATL. Many individuals have taken more than one workshop. By May 1, 1997, the end of the current academic year, it is estimated that more than 700 seats in ATL workshops will have been filled.

The original mission statement also called for the ATL to be open as a resource center twenty hours per week during fall and spring semesters. With the help of a full-time graduate assistant, this goal is also being met. Many faculty and staff take advantage of the "Open Lab" time to try out new programs, do color printing, or get individualized help.

Phase II of the funding for the ATL occurred in November 1996. By the start of classes in January 1997, three additional workstations had been added to the classroom area. Also purchased were a server, a color printer, new computer desks and chairs and additional software. The hiring of a graduate assistant and getting more faculty members' to teach workshops helped the ATL expand its workshop offerings.

The ATL has tried to teach a wide variety of workshops on instructional technology. More than 30 different workshops have been offered to date. These workshops include Beginning PowerPoint, Advanced PowerPoint, Creating Web Pages, Advanced Web Pages, Using Authorware, Macromedia Director, Adobe PhotoShop, Advanced PhotoShop, Microsoft Excel, Gradekeeping Software, Windows 95, Netscape Navigator, and Teaching on the Internet.

When Phase III is funded in the summer of 1997, the ATL will be equipped with twelve "student" workstations, an instructor's workstation, a server, a video projector, a visual presenter, video-conferencing hardware, and VCR, in the classroom area. The ATL will also include a resource area with two computer workstations, a flatbed scanner, a Hi-8 video camera, and video capture software. Long-range plans also call for multiple graduate assistants to help prepare materials for faculty instructional needs. The center will conduct workshops for faculty members from other campuses during the summer months and at other appropriate times of the year. Plans for two and four-day workshops are being developed for July 1997. These workshops which will enhance the reputation of ETSU as a leader in using instructional technology and multimedia instruction, offer strong potential as a revenue source. The excitement of multimedia is also helping fuel the development of a new MA program in Professional Communication at ETSU.

Response from faculty and staff members to the ATL and its workshops has been extremely positive. Feedback from faculty members indicates that this program is changing the way faculty teach. Nearly every workshop offered has a long waiting list. There is great excitement about our newest project, a four-part workshop on teaching on the Internet. As we approach the 21st century, many faculty members at ETSU are eager to learn to use technology to improve their teaching. ETSU's Academic Technology Lab is helping them to do it.

[TOP]

Middle Tennessee State University's Digital Media Center: Supporting the Development of Technology-Based Instruction

Gina Roberts

- Abstract
- Facilities
- Policies and Procedures
- Personnel
- Services
- Orientations
- Future Plans

Abstract

Middle Tennessee State University's Digital Media Center is a faculty multimedia development center that contains hardware, software, and support to enable faculty to develop technology-based teaching materials. In the Digital Media Center users create and edit digital movies, animation, 3D models, still images, and sounds; author presentations and computer-based training applications; and record CD-ROMS. With a connection to the campus network and the Internet, users also transfer files, browse the Web and create home pages.

This paper contains information on the facilities and operation of the Digital Media Center. Readers will get an overview of the facilities that are available, the policies that govern the Center, the personnel that staff the Center, the services the staff provides, the training that takes place for users, and the plans for the future of the Digital Media Center.

Middle Tennessee State University's Digital Media Center: Supporting the Development of Technology-Based Instruction

Faculty at Middle Tennessee State University are very much involved in the development and use of technology-based instructional materials. In addition to using commercially produced materials such as videotapes, laserdiscs, and CD-ROMS; faculty develop their own multimedia presentations and computer-based training applications. They share these materials with their students when teaching in specially equipped master classrooms and labs; and when using multimedia carts and portable projection equipment in classrooms or at conferences.

Early adopters of instructional technology at MTSU have some of the hardware and software needed to develop technology-based instructional materials either in their offices or in their departmental labs. To provide some of these early adopters and most of the mainstream faculty with the hardware, software and support to enable them to develop these materials, the Office of Information Technology opened the Digital Media Center (DMC) in the Spring of 1997.

Facilities

The Digital Media Center houses six multimedia development stations. Hardware and software for creating and editing digital movies, animation, 3D models, still images, and sounds; authoring presentations and computer-based training applications; and recording CD-ROMS is available on the development stations. With a connection to the campus network and the Internet, the DMC also provides facilities for transferring files, browsing the Web and creating home pages. Hardware and software housed in the center is described below.

Hardware

- 4 IBM-Compatible Pentium Computers
- 2 PowerMacintosh Computers
- 2 2GB External A/V Hard Drives
- 5 Zip Drives
- 2 Audio/Video Capture Cards
- 1 4GB Hard Drive System
- 2 Videocassette Recorders
- 1 Color Video Monitor
- 1 Laser Disc Player
- 2 CD-ROM Recorders
- 2 Color Flatbed Scanners
- 1 35MM Slide Scanner
- 1 Digital Still Camera
- 1 Digital Video Camera

The computers located at the development stations contain at least 48 to 64 MB of RAM and house 1 to 2 GB hard drives.

Software

- Software packages are available for:
- Authoring presentations Authoring computer-based training applications
- Browsing the Web Capturing and editing audio and video
- Creating digital animation
- Creating and editing digital images
- Creating Web pages
- Editing sound
- Recording CD-ROMs
- Scanning 35mm slides
- Scanning images
- Scanning text
- Transferring files via the Internet

Policies and Procedures

At the present time, the Digital Media Center is for use by faculty only. Student assistants working on projects for faculty can use the center with written permission from the faculty member.

The Center is open five days a week for eight hours a day during the fall and spring semesters. Limited hours are posted during the summer semester. Faculty may sign up for blocks of two hours at a time per development station, but may work for longer periods of time if space is available. Even though use of the facility is free; consumable media such as diskettes, zip disks, recordable CDs, and videotapes are provided by the faculty member.

The staff of the DMC assist faculty with the conversion of copyrighted materials to digital format based on the Fair Use Guidelines for Educational Multimedia.

Personnel

The staff of the Digital Media Center consists of a full-time Instructional Technology Specialist along with two to three part-time student interns per semester. Interns are Junior or Senior level students from departments such as Art, Computer Information Systems, Computer Science, Radio/TV-Photography, and Recording Industry. Interns work for course credit and it is preferred that they have experience in graphic design, digital video, or computer programming.

These internships provide an excellent opportunity for students to use skills they've gained in their coursework as well as learn new skills for use in their careers. It also gives them a chance to sharpen their communication and teamwork skills. Faculty benefit not only from having assistance with the development of technology-based materials, but also from having feedback from the interns on the usefulness of their products to students.

Services

The Digital Media Center staff provide three levels of service to MTSU faculty. Faculty who are interested in developing multimedia presentations or computer-based/assisted instruction meet with the staff of the Center to receive an orientation to the equipment and then proceed to work on their own. Those who develop their own applications, but don't have the time or equipment to scan images, digitize video, or record CD-ROMs bring their materials to the DMC for conversion to a digital format or for recording to CD-ROM. Faculty who would like to have a computer-based application developed and do not have them time or have not developed the necessary skills may bring projects to the Center for design and development. At this third level, the faculty member works closely with the DMC staff as a subject matter expert.

Orientations

Orientations to the Digital Media Center are held several times throughout each semester. These orientations are not usually hands-on but instead focus on a demonstration of the capabilities of the equipment in the Center. One-on-one training sessions are held on specific pieces of equipment with individual faculty members.

Future Plans

The Office of Information Technology currently offers workshops for faculty in productivity, presentation, authoring, and communication software. During the summer and fall of 1997, the Digital Media Center staff will begin to offer specialized workshops on topics such as scanning techniques, digital video production, and developing computer-based training.

As word of the Digital Media Center spreads and more mainstream faculty become interested in using technology in their teaching, the DMC will continue to grow. Up to two more development stations will be added over the next few years. A permanent staff member may be added in a few years and new student staff members will certainly join the team.

The goal of the Digital Media Center is to offer services that enable faculty to develop instructional materials that meet their course objectives. As faculty levels of expertise grow and needs change, the services offered by the Digital Media Center will grow and change as well.

[TOP]

Creating a Course Homepage

Larry Summary

Rebecca Summary

- Abstract
- Getting Started
- Adding Interactivity
- Notes

Abstract
For many faculty, the question now is not "Should I use the Web in my class" but "How do I get started?" and "What does a good Web course page contain?" These questions are addressed in this paper and presentation. A Web page that gives faculty many ideas and resources to use in developing their own page is cited and well as course homepages in use by faculty at Southeast Missouri State University.

Getting Started
In order to create a homepage on the World Wide Web, it is helpful (some say necessary) to have some familiarity with Hypertext Markup Language (HTML), the language that Web browsers such as Netscape and Internet Explorer read to display your pages. Actually, there are two versions of HTML, version 2.0 and version 3.0. Not all browsers support all of the extensions in version 3.0, so you need to make sure that the browsers that your students use will support your pages. Information on version 2 may be found at **http://home.netscape.com/assist/net_sites/html_extensions.html** ; go to **http://home.netscape.com/assist/net_sites/html_extensions_3.html** for information on version 3.

HTML is not complicated, and a few hours of study should have you well on your way. There are many good books on the market to help you get started, as well as a number of good Web sites. You might want to take a look at Netscape's Web page help (**http://home.netscape.com/assist/net_sites/**), The Web Designer (**http://web.canlink.com/webdesign/**) and the HTML Library (**http://copper.ucs.indiana.edu/~mchaifet/htmllib.html**) for guides to writing HTML. An alternative is to acquire a Web page generator such as Netscape Navigator Gold (free for educational users at www.netscape.com), Microsoft FrontPage (**www.microsoft.com/frontpage**), Adobe Pagemill (**www.adobe.com/prodindex/pagemill/main.html**), NetObjects Fusion (**www.cnet.com/Content/Reviews/Hands/011397/fusion.html**) or Softquad HotMetal Pro (**www.softquad.com/products/hotmetal/hm-ftp.htm**). Even with the use of these web page generators, a knowledge of HTML is very useful, especially if you want to edit your pages.

The next step is to decide exactly what will be included in the Web course pages(s). Most faculty begin by placing their course syllabus on the Web. This contains the usual administrative information such as office location, phone, office hours, dates of exams, etc., and information about the content and structure of the course. If you have your course syllabus in Microsoft Word for Windows 95, you can add HTML tags by using Internet Assistant, which can be downloaded from Microsoft's homepage (**http://www.microsoft.com/word/internet/ia/sysreq.htm**). The authors' limited experimentation with this tool found that it transforms a Word document so that it is readable by a Web browser, but it is a basic Web page that you may wish to edit to add larger fonts, etc.

If you use Microsoft Office 97, tools are included to allow you to publish documents from Word, tables and charts from Excel, databases from Access and presentations from PowerPoint on the Web. It is a

good idea to include a hyperlinked e-mail box on your course page so that students can contact you easily.

Adding Interactivity

What makes the Web so exciting is that you can go beyond the usual static course syllabus to incorporate interactive elements. In fact, without interactivity, you might as well hand out a printed course syllabus on the first day of class.

An easy way to incorporate some degree of interactivity is to include hyperlinks to other relevant information. You may wish to start with simple hyperlinks within your own website. For example, upcoming exams may be listed with hyperlinks to old exams. Or, you may wish to add hyperlinks to class discussion questions or examination study questions. Another possibility is a hyperlink to your Power Point presentations, transformed into HTML using the Windows 95 or 97 version of Power Point.

External hyperlinks are next. Finding appropriate, high quality Web sites will take some time. A good place to start is to utilize Web search engines such as Yahoo (www.yahoo.com), AltaVista (www.altavista.com), Lycos (www.lycos.com), InfoSeek (www.infoseek.com) WebCrawler (www.webcrawler.com), Excite (www.excite.com) and Magellan (www.mckinley.com).3 Each of these search facilities works somewhat differently, and so it takes practice to become a proficient Web hunter. The complaint heard most often is that these search tools return too much information to the user, and so it takes time to sort through and find relevant Web sites. However, the time is usually well spent. For example, a collective bargaining course Web page at Southeast Missouri State University (**http://economics.semo.edu/rSummary/index.htm**) includes links to Web sites of unions (including a great site with union history in a multimedia format), corporations, the National Labor Relations Board, law firms specializing in labor relations, the Bureau of Labor Statistics and the U.S. Department of Labor. It also has links to Web sites that include negotiation games, a dictionary of collective bargaining and labor relations terminology, collective bargaining FAQs, court decisions and labor laws. This semester, the class has been following the American Airlines/Allied Pilots Association negotiations via Web pages. A genetics course homepage at Southeast (**http://Biology.semo.edu/web/courses/genetics**) includes a link to a virtual flylab, where students may select characteristics and breed flies. These sites are used during class to focus attention on real life applications of course material. They may also be used by students to gather information for research projects.

Another way to include interactive elements into Web pages is to incorporate forms. These may be used for a variety of purposes. A philosophy instructor at Southeast Missouri State uses forms for students to submit homework assignments (**http://economics.semo.edu/dholt/ASSIGN.HTM**). An MBA course homepage at Southeast includes forms for students to submit feedback concerning the structure and content of class sessions (**http://economics.semo.edu/economic/ba661/index.html**). Students can make comments or ask questions. A form may be written in HTML or it may be included as a CGI script which is executed when a button or hotword is clicked.

Bulletin boards are useful for communication between students and instructor and among students. Economics instructors at Southeast use bulletin boards to announce assignments and to carry on conversations about current economic events (**http://economics.semo.edu/economic/econbull.htm**). Bulletin boards are especially useful for students who might have to miss class because of illness or other emergencies. They may also be useful when group assignments are part of the course requirements. Members of a group may carry on at least part of their communication via the bulletin board. Including a bulletin board on a Web page requires software installed on the Web server; a relatively easy system to install is WebBoard by O'Reilly and Associates (**www.ora.com**). Talk with your system administrator about software appropriate for your campus system.

Listserves are another useful resource for course management and communication. Students sign up for a listserv and then receive messages from the instructor and/or from other students in their e-mail box. Again, this is especially useful for students who may be absent from class or for students working on group assignments. It also gives the instructor the ability to announce changes in assignments or other

relevant course information. Including a listserv on a Web page also requires special software installed on the server; an example is Mailsite (**http://www.rockliffe.com/contact.htm**). You will need to talk with your system administrator.

Interactivity can become somewhat sophisticated with the introduction of database applications. Faculty in some disciplines may include assignments linked to databases, and the databases may be accessed by students via the Web. For example, a faculty member in the economics department at Southeast Missouri State is designing a database assignment which requires students to complete calculations using yearly data for Gross Domestic Product. Other faculty at Southeast use database gradebooks on the Web (**http://economics.semo.edu/dholt/StudentGb/search.cfm**). Students may access their grades via a password protected interface. The faculty member has his/her own interface (password protected, of course) for entering and changing grades. Simple database applications for the Web may be developed using the Windows 95 or 97 version of Access. More sophisticated applications may be developed using software such as Cold Fusion.

Video and sound may be incorporated into a Web page. These require plug-ins such as EchoSpeech (**http://www.echospeech.com**), RealAudio (**http://www.realaudio.com/products/ra2.0**) and CineWeb (**http://www.digigami.com/cineweb**) to be added to the students' Web browser as well as specialized software on the server. There is also the capability to incorporate real time conferencing into your Web site via software such as iChat (**www.ichat.com**) and Microsoft NetMeeting (**www.microsoft.com/netmeeting**). These also require software on the user end as well as software on the server.

Faculty may also design their own multimedia presentations and incorporate them into Web pages with the use of software such as Asymetrix Toolbook (**www.asymetrix.com**) and Macromedia Authorware (**www.macromedia.com**). This degree of interactivity requires specialized software and hardware and may require the assistance of an instructional technology specialist. It also requires that students have access to appropriate hardware (sound and video cards) and software (appropriate versions of Web browsers and the necessary plug-ins).

Finally, you will want to pay some attention to the appearance of your Web page. Include some graphics or clip art, which you can purchase or download from Web sites such as Clip Art Collection (**http://www.ist.net/clipart/index.html**), Multimedia Source (**http://www.itec.sfsu.edu/multimedia/multimedia.html**), or Psyched (**http://www.econ.cbs.dk/~gemal/psychedupgraphics/index.html**). You can also add color or wallpaper to your background; any of the HTML sources listed above will tell your how.

Interactive course Web pages may be simple or quite sophisticated. Don't be content with static pages; some degree of interactivity is necessary to fully utilize the power of the Web. Your page is a work in progress, always under construction. Course Web pages are a way to make public the scholarship of teaching, a way to make all of your knowledge and creativity available to others.

NOTES

1. Take a look at www.economics.semo.edu/cstl/workshop/index.htm to view information and sites listed in this paper.

2. The Internet Assistant add-on is also available for the Windows 95 versions of Power Point, Access and Excel.

3. A short review of search engines is included in the March 1997 issue of PC Computing on pages 123-126. This issue also includes lots of other information about the Internet.

[TOP]

Guiding Students in Using the World Wide Web for Research

Kristin Kubly

- Abstract
- Endnotes
- Reference List

Abstract

With the growth in popularity of the World Wide Web in the past few years, many students see this new format as a one-stop-shopping place for information and research. While there is some excellent information to be found on the World Wide Web, there is also a great deal of material that would not be suitable as a source for a college paper. It is important that educators are able to guide students in using the World Wide Web appropriately by teaching them to evaluate Internet resources using criteria designed to weed out the authoritative sources.

The World Wide Web, with its ease of use and graphical savvy, has quickly become a favored method of research for many college students. Using one of the numerous Web resource guides or search engines available, it is fairly easy to find at least some information on almost every conceivable subject without a great deal of traditional library research. However, this accessibility of information is not without its problems. One major issue for educators is whether students are able to determine the quality of the information they are accessing.

Much of the information available on the Web has not had the rigorous editing and verification of facts through which traditional print or even commercial electronic information sources must go. In general, information gets filtered one of three ways. Sources published by authoritative sources such as the federal government or a well-known organization are accepted at face value to be valid. Information that has gone through some type of editorial or peer review and published in a reputable journal is also widely considered of good authority. Finally if it is evaluated by reviewers and/or librarians, users tend to trust the information.1

Therefore, when students use their college library, they know that the information contained within its walls has been evaluated by a librarian, and is considered a reliable, informative source. When a database is searched for articles, only journals that are considered professional or scholarly are usually indexed. There are none of these filters on the World Wide Web. Libraries may make the Web available to their patrons, but there is no way to control the information that is accessed by it.

Because of this, it is crucial that students are able to evaluate the information on the Web for its quality and veracity. Therefore, educators must be familiar with the kind of sources out on the Web, and themselves be able to identify which are legitimate so that they may guide students in using the Web for research.

To be a critical World Wide Web user, one must first be aware of the strengths and weaknesses of the the Internet. For example, the Web is a very good place to find basic factual information such as financial statistics or the address of a member of Congress. It also tends to be more current than print

sources, so it is an excellent place to go for very recent or even breaking news stories. Its ability to expand a library's resources beyond what it physically contains is another strength. For example, much of the government information that smaller libraries did not have the room for is now available for anyone to find.

For in-depth research, however, the Web generally offers little that would be of value. Information on the Web often comes in bits and pieces, much of which is of questionable authority. There is also a great deal of misconception about just what type of information is available on the Internet. In general, copyrighted material is not available. This includes the full-text of most journals and copyrighted books or similar material. Some older books in the public domain are available full-text, and some magazines and journals do allow access to some of their articles. But the vast majority of information on any given subject will not be found on the Internet for free. Students just learning to do research need to realize that the Web is not a substitute for the library.

However, knowing that many students will start their research with the World Wide Web anyway, some librarians have attempted to guide students to authoritative online documents by creating their own subject guides to Internet sources. These guides contain lists of Web sites that have been examined and evaluated by trained librarians, and are considered useful for student research. These are often excellent places to start finding information on the Web. Many also contain bibliographies of traditional print sources that should also be consulted in order to remind students that not everything is available online. Most academic library Web pages have some sort of subject guide to the World Wide Web, or at least contain links to other sanctioned guides that are academic in nature.

Yet not every student looking for information will begin with an academic Internet resource guide. They must learn how to judge whether the sources they find elsewhere are credible or objective. Especially when searching for information on explosive issues such as abortion or racism, students using documents on the Internet need to be aware of slanted viewpoints or questionable statistics.

So how do we teach students to be critical users of the Internet? First, it is important to know how most people go about looking for information on the Web. One of the easiest and most popular ways to find information on a subject is to use one of the many search engines now available. These searchable databases of Web sites will scan the Internet for key words and produce a list of sites that contain those words prominently on the page. However, Internet novices (and even more experienced users), may have a false assumption about search engines, thinking that results generated by a search engine have undergone some type of filtering process. In general, this is not the case. Most automated search engines look only for keywords which is not the same as evaluating.

There are three separate components to a search engine: the selecting function which identifies and gathers Web sources, the compiling function which stores and makes these sources accessible, and the searching function which determines the access points for retrieving Web pages.2 The selecting function may have some evaluative components. On some search engines, people must register their sites and have someone else decide whether to include them. Yahoo! (http://www.yahoo.com) uses this method to decide which sites to include in its index. This is a much more selective process than that used by many search engines such as Lycos (http://lycos11.lycos.cs.cmu.edu/) which is more comprehensive in its coverage, but does no evaluation of what it has included.

Other search sites such as Magellan (http://www.mckinley.com) have human evaluators rate pages against a specific set of criteria to determine their reliability and usefulness. These criteria include depth (is the site comprehensive and up-to-date?), ease of exploration (is the site well-organized and easy to navigate?), and "net appeal" (is the site innovative or thought-provoking?).3 Magellan then gives one to four rating points or "stars" to the site, with four stars being the best. A similar rating organization is the Point Corporation (http://www.pointcom.com/) which evaluates sites on a scale from one to fifty points. Their criteria is content (how broad is the information; is it accurate, complete and up-to-date?), presentation (is the site attractive and easy-to-use?), and experience (is the site fun and worthwhile?).4 Web site developers whose pages are given high scores by these rating systems may put Magellan's or Point's "seal of approval" on their home page, so that users may know that the site has been evaluated and rated a high score.

Organizations such at Magellan and Point Corporation have made a good start in evaluating Web sites. However, their approach is to rate sites for the general public, not for those seeking to do serious research. As yet, there is no real scholarly criteria for Web sites. So even though a site is considered to be attractive and have "net appeal" by a rating system, it does not mean that the information contained in the site is necessarily appropriate for a college-level paper.

So how does one tell just by looking at a Web page whether it is an informative, reliable site? In general, one can evaluate a Web site in the same way a print source would be evaluated, with some minor adjustments.

Tate and Alexander5 have developed a lesson plan for teaching students critical evaluation skills for World Wide Web resources. In it, they discuss the five criteria used for evaluating traditional print sources and how these criteria may be applied to Web sources. These traditional criteria are accuracy, authority, objectivity, currency, and coverage.

Accuracy and authority are generally interrelated. If a Web site was produced by an authoritative source, it is much more likely to be accurate. However, determining the authority for Web sites is not always easy. Even if the author's name is listed, there may be no more information about him or her. Another important point to remember is that the person's name at the bottom of a Web page may or may not be the author, but may simply be the Webmaster who has only the responsibility for maintaining the site, not actually writing the material. There should also be a way to contact the author, either through email, a phone number or an address.

Preferably there should be biographical information about the author either on the same page, or linked to the page so that one may ascertain what the credentials of that person are. If there is no such biography, the user can sometimes tell if the author seems credible through the knowledge of pertinent theories or schools of thought discussed in the text, citations to reliable sources, or if it is a controversial topic, the acknowledgement of other opinions.6

The body that sponsors the site should also be clearly indicated. Again, the site's domain name may simply be that of an Internet presence provider which has no responsibility for the content of the site. There should be a name of an organization clearly presented on the document, either in the header or footer, with a link to that organization's home page. The relationship between the sponsor of the site and the author should also be clear. Is the author a representative of the organization, or is the document merely residing on the group's Web site? If the author or sponsoring organization is difficult to determine, the quality of information should be questioned.

Objectivity seems to be much more of a problem on the Web than in traditional print sources. Because it is so much easier to publish on the Web, many groups who previously had no publishing outlet now find it easy to use the Web as a "virtual soapbox."7 If the sponsoring organization is not well-known, one should look in a secondary source to find out what the institution is. If the organization is known, the reader should think about what type of group it is, and if it is an objective source. If there is still a question, the information should be verified by looking in another reliable source.

Currency is usually touted as one of the Web's strengths. It is much easier to keep online information up-to-date than print sources. However, not all Web pages have dates, so it is sometimes difficult to determine how current the information is. And if a date is included it could be the date the page was originally written, the last update, or the date when it was made available on the Web. A good information source will always put a date, usually at the bottom, and clearly define what the date indicates. If no date is given, the directory in which it resides may be viewed in order to read the last date of modification.

Finally, coverage is important to note as well. Does the site have the same coverage as similar print sources? Are the topics covered by the Web source noted on the site's main page? Many Web sources contain links to related information or cited sources. Do these links work, and what types of sources do they access?

Library Journal uses some additional criteria when evaluating Web sites for their WebWatch and Infofilter projects.8 The Infofilter Project involves a group of reference librarians who are attempting to apply time-tested methods of reviewing information sources to the Web. (See the site: http://www.kcpl.lib.mo.us/infofilter.htm for more information). WebWatch is a regular column in Library Journal, which offers tips on useful Web sites. Some of the criteria used at these projects include content, organization, accessibility and search capabilities.

Content is obviously the first thing one should look at when evaluating a Web source, but surprisingly many sites are taken at face value. Users should carefully examine the information to decide if it is useful and accurate or if it seems to be doubtful or repetitious. A dead give-away to a questionable source is poor spelling, grammar and literary composition. These are the hallmarks of an amateurish Web page. The graphics should also be appropriate for the content, and not over-used. Students may get distracted by cute graphics rather than concentrating on what the actual content is saying.

Organization of Web sites continues to be a problem as inexperienced Webmasters create pages which are cluttered and difficult to use. The important information should be easy to find, and near the top of the Web site. Pertinent information should not be buried beneath several layers of links, and each page should have some way to return to the home page.

Accessibility is also a constant problem on the Web. Sites should consistently be available for verification and have a good response-time. If the pages are heavy on graphics, a text-only alternative should be available. If a Web document is used as a reference for a paper, the student should double-check the page before citing it to make sure that the information still exists in the same format, and that the link has not gone dead. The date that the page was visited should be noted in the citation.

Large sites with a great deal of information should also have a search engine available. It should instruct users how to use it, and have Boolean capabilities with an output that is logical and easy-to-understand. While having a search engine does not indicate whether the information is any better than a site that does not have one, it does make it easier to go back and find specific pieces of information for later verification.

So once a student has found some documents on the Internet that they feel are good, authoritative sources, how do they then cite this information in their paper? If a traditional paper version of the source is available, it is usually best to cite that version because it cannot change the way electronic sources can. If the source is only available online, it is important to provide as much information as possible to accurately identify the source.

The format is generally the same as it is for printed publications, along with some additional information to show in what medium the information was accessed and its availability. There is not yet one definitive method for citing Internet documents, but there has been some consensus on the basic format. Janice R. Walker of the University of South Florida, has developed some guides to citing many types of electronic resources such as Web sites, FTP sites, Telnet sites, gopher sites, etc. These have been endorsed by The Alliance for Computers and Writing and have gained wide acceptance. The following is how to cite a Web page from her "MLA-Style Citations of Electronic Sources":9

Author's Lastname, Author's Firstname. "Title of Document." Title of Complete Work (if applicable). Version or File Number, if applicable. Document date or date of last revision (if different from access date). Protocol and address, access path or directories (date of access).

For example, the citation to this author's Web site on finding company information if accessed on February 20, 1997 is:

Kubly, Kristin. "Finding Company Information." The Business Page. January 16, 1997. http://frank.mtsu.edu/~kkubly/company.html (February 20, 1997).

The Publication Manual of the American Psychological Association has not yet addressed the issue of Internet sources. Walker has developed the following guide based on the APA style which has also been endorsed by the Alliance for Computers and Writing:10

Author's Last Name, Initial(s). (Date of work, if known). Title of work. Title of complete work. [protocol and address] [path] (date of message or visit).

The above citation in the APA style would read:

Kubly, K. (1997). Finding Company Information. The Business Page. http://frank.mtsu.edu/~kkubly/company.html (February 20, 1997).

There are other guides to citing Internet sources available on the World Wide Web. One useful source is the ISO 690-2 Standard for Bibliographic References to Electronic Documents.11 Their format is slightly different from the above styles, but it addresses other types of electronic information such as online information databases and computer disks. The standard can be found at http://www.nlc-bnc.ca/iso/tc46sc9/standard/690-2e.htm.

Other useful Web pages on this issue include:
Citation Style for Internet Sources: http://www.cl.cam.ac.uk/users/maw13/citation.html
Citing Electronic Information: http://www.pnl.gov/ag/refs/electron.html
How Do You Cite URL's in a Bibliography?: http://www.nrlssc.navy.mil/meta/bibliography.html

Endnotes

1 D. Scott Brandt, "Evaluating Information on the Internet," Computers in Libraries 16.5 (1996): 44. (Available http://www.infotoday.com/cilmag/may/techmans.htm)

2 Brandt.

3 T. Matthew Ciolek, "The Six Quests for The Electronic Grail: Current Approaches to Information Quality in WWW Resources," Review Informatique et Statistique dans les Sciences humaines (RISSH) 1-4 (1996): 45-71. (Available http://coombs.anu.edu.au/SpecialProj/QLTY/TMC/Quest1.html)

4 Ciolek.

5 Marsha Tate and Jan Alexander, "Teaching Critical Evaluation Skills for World Wide Web Resources," Computers in Libraries 6.10 (1996): 49-51.

6 Elizabeth E. Kirk, "Evaluating Information Found on the Internet," Milton's Web Home Page, December 18, 1996, http://milton.mse.jhu.edu:8001/research/education/net.html (January 19, 1997).

7 Tate and Alexander, "Adapting Five Traditional Print Evaluation Criteria to Web Resources," Teaching Students to Think Critically about Internet Resources, November 6, 1996, http://weber.u.washington.edu/~libr560/NETEVAL/criteria.html (January 16, 1997).

8 Boyd R. Collins, "Beyond Cruising: Reviewing," Library Journal 121.3 (1996): 124.

9 Janice R. Walker, "MLA-Style Citatons of Electronic Sources," ACW Style Sheet, 1996, http://www.cas.usf.edu/english/ww

[TOP]

Practical Tips and Strategies for Finding Information on the Internet

Rhonda Armstrong

Lynn Flanagan

- Abstract
- Introduction
- Search Engines
- Major Search Engines and Search Directories
- Mega Search or Parallel Search Sites
- Specialized Search Engines
- Conclusion
- List of Search Engines
- Works Consulted

Abstract

Since the volume of information available on the World Wide Web is so overwhelming, searchers need to acquire additional skills in order to find relevant sites. This paper presents the most important searching concepts and techniques to use in searching the major search engines. Selected subject directories, mega search engines, and specialized search engines are also covered. Tables are included to specify search capabilities, display features, and other special features of several of the most commonly used search tools.

Introduction

As the quantity of information available on the Internet continues to explode, it is increasingly necessary to learn efficient ways of finding specific bits of information. Numerous search tools are available to help locate appropriate sources. Without these search tools, the chances of finding anything on the Web would be slim. Even with the help of the search tools, users must be able to use sophisticated searching techniques in order to find relevant information. This is essential due to the amount of information included in the indexes and the depth of the indexing. The purpose of this article is to help users understand the basics of how the major search tools work and what is included in the indexes. Only those tools which are freely available on the Internet will be included.

There are several different kinds of search tools available free on the Internet. One type, usually referred to as a directory or a subject listing, is created by humans who actually look at a site and assign it to a subject category. Yahoo! is probably the oldest example. Sites are compiled into a database with hot links to URLs and usually a brief description or review of the site. Even the largest directories cover only a small fraction of the pages available on the Web. Even so, when searching for information on

a general topic, a directory is usually the best place to start.

Another type of search tool, usually called a search engine, covers a much larger part of the Internet. Search engines send computerized "robots" over the Web to find pages and record all or part of each page. The information is compiled into a hugh index. It is this index which is searched when a user enters a query.

There are many different search engines now available, and often the same query will find completely different hits using the different engines, depending on how and what the engine actually searches. When information on a very specific topic is needed, a search engine is the best place to begin.

Searchers must use several different search engines to assure coverage of a topic, just as several different print indexes must often be consulted. Because it is time-consuming to go to several different search pages and type in the same query over and over, another type of search tool has been created called Mega search pages or Parallel Search pages. They submit a query to several search engines simultaneously or provide a list of search engine query boxes on one screen. There are also PC based software programs available for purchase which accomplish this multiple search, but they are not covered in this article.

In the scramble to stay on top in the battle for numbers of visitors to their search pages and therefore the advertisers' dollars, some providers of search tools are attempting to add extra value to their sites. Some focus on a particular subject; some which were subject listings have added a keyword search of the Web; some which were keyword search engines have added subject category listings and/or reviews of sites. Just as most things on the Internet are constantly changing, so the search sites multiply, divide, combine with each other, appear, disappear, and change.

Search Engines

Different search engines have different features and treat searches in slightly different ways. Although it is easy to simply type in terms in a query box and get results, it is essential for users to understand specific search techniques in order to get the most from each different one. The importance of some of these techniques will be discussed and a chart presented at the end of the paper to identify how some of the major search engines treat them.

Treatment of Single words:

How does the engine treat a single query word? Some automatically determine the root of a query word and find all occurrences of the root. If this simply means it retrieves both the singular and plural forms, it may be a helpful feature so that users do not have to enter two words (as "cat or cats"). However, if the root has several possible endings, some of which are not relevant to the query, then unwanted matches may be retrieved. For example if the word "psychologist" is entered, automatic searching for the root would find all words beginning "psychol..." and thus find psychology, psychological, psychologically, psychologist, psychologists, etc.

Truncation or wildcards:

Sometimes a user wishes to search for a root word or partial string. Many search engines allow the use of a symbol, often an asterisk (*), as a wildcard to substitute for no characters or a set number of characters. This capability is useful in many instances to avoid entering several forms of a word connected by OR.

Case sensitivity:

Some search engines are case sensitive and some are not. Usually the case sensitivity is only when a query contains capital letters and not when a word is all lower-case letters. If the word "turkey" is entered as a query, most engines will return all references to Turkey or turkey or TURKEY or even TurKey. However, if the entry word contains any capital letters then only words which match the capitalization exactly will be retrieved. "Turkey" retrieves only Turkey and "TURKEY" retrieves only TURKEY. This feature can be very useful for proper nouns and for words with unusual capitalization, such as NeXT.

Treatment of Multi-word Queries and Phrases:

Sometimes multi-word queries may be searched using an implied AND, an implied OR, or as an exact phrase. If AND is assumed, then a search for Hillary Clinton returns all references to both words appearing anywhere in the document in any order. They may refer to Sam Clinton and Hillary Jones. An assumed OR returns references to any occurrences of the word Hillary PLUS any occurrences of the word Clinton. The document may discuss only Hillary Jones and have nothing to do with Hillary Clinton. On the other hand, if the query is treated as a phrase, then the words Hillary Clinton must appear next to each other in that order. This search would miss any references to Hillary Rodham Clinton or Clinton, Hillary.

Some search engines allow the search for an exact phrase by enclosing the words in double quotation marks, as "to be or not to be," or by a choice from a menu. Many also allow the user to enter on the query line such limiters as a plus sign (+) to insure that a term is present and a minus sign (-) to eliminate a term. If an engine defaults to connecting terms with an OR, then using the plus sign (+) before each term you require will give more relevant results. Often the Boolean operators AND, OR, and NOT or the proximity limiters NEAR, ADJACENT, or FOLLOWED BY may be entered in the query. This is usually true if an "Advanced" search is available. Some engines offer a pull-down menu allowing such choices as "All of the words" (equal to AND), "Any of the words" (equal to OR), and "Exact phrase".

The NEAR operator requires that the two terms be within a certain number of words or characters of each other, but they usually may be in any order. In Alta Vista NEAR requires the words to be within 10 words of each other while in Open Text it is within 80 characters and WebCrawler provides a switch to indicate how close NEAR should be. FOLLOWED BY is a less frequently available option. As is implied, the order of the words is retained but the distance between words varies. ADJACENT usually means the words must be together in the order indicated. The user should read the documentation for each search engine to determine which of these limiters are available and exactly how they work in each one.

Another important question is whether the search engine returns hits on every word in the query, or ignores certain "stop words" which occur many times in the index. Can you search for the quotation "to be or not to be" or are all those words considered stop words? Many online databases ignore small unimportant words such as conjunctions and prepositions, but some Web search engines will also ignore such words as "web," "internet," "system," and "university" because they occur so frequently. The AltaVista Search Revolution has a list of the 1,000 most common words found on the Web (Seltzer 240-254). If possible, avoid those words in a query. Several search engines save every word of a Web page in the index which makes it possible to do exact searches for complete phrases and sentences. They may not be able to find our Shakespearean quote when it is entered as a group of words because the common words are ignored, but they will find it when it is searched as a phrase. To lessen the problem of ignored search words, users should identify rare or unusual words or proper names associated

with the topic, enter all words that may matter, or search for an exact phrase when possible.

Still another question is whether a query can be entered as a natural language question, such as "How long is the day in Juneau, Alaska in November?" Some search engines can take such a question and focus on the relatively rare words, discard the common words, and return the most likely matches.

Major Search Engines and Search Directories

AltaVista is fast, powerful, big, and fairly up-to-date. The Simple Search mode is easy to use, but knowing some tips such as enclosing phrases in quotes and using the + and - helps to narrow the results. The Advanced Search allows sophisticated search techniques, but you must know how to formulate the complex queries. Users may also control the relevancy ranking by indicating terms to be weighted highest. Note that if no terms are entered in the box for weighting, then the results of Advanced searches will not be ranked at all.

Web searches may be limited by domain, host, or media type and Usenet searches may be limited by the structural elements such as all or part of an e-mail address, anything on the subject line, or all or part of a newsgroup name. See the help pages for examples of this very powerful feature.

HotBot is also fast and big. It claims to include the most Web pages in its index. Pull-down menus allow the equivalent of Boolean features. The Expert mode lets users narrow searches to a particular technology, site, domain, or geographic location. Open Text Index is not as large as HotBot or AltaVista, but it is a good alternative for an obscure topic. The Power Search offers standard Boolean functions and includes not only NEAR but also FOLLOWED BY. Truncation is not available, so alternative forms of a search term must be entered with OR.

WebCrawler is not as fast as AltaVista or HotBot, but it returns good results. Boolean features are available. The NEAR function allows users to set the proximity, for example Franklin NEAR/2 Roosevelt will get either Franklin Roosevelt or Franklin Delano Roosevelt. WebCrawler is operated and content produced by America Online, but it is free to the Internet. In addition to the Internet search engine, it offers fifteen content categories with sub-categories and reviews. Included in the subjects are such categories as entertainment, travel, sports, and reference which are aimed at the general public. A recent partnership with MapQuest allows a unique feature on WebCrawler. When a search query in WebCrawler contains the name of any of the 22,000 U.S. cities in the MapQuest database, the results page will include a hypertext link to an interactive map of that city.

Excite is one of the better of the search tools due to the combination of the search engine, reviews, current news, and other features. It allows searching of the web, reviews of sites, and Usenet newsgroups. Excite's NewsTracker contains articles from over 300 newspapers and magazines. A personalized start page can be initiated through Excite Live!

Excite is fairly easy to use yet powerful due to the natural language searching, the capability of all boolean functions, phrase searching, etc. It will also provide the user with similar "More Like This" sites. In the display of the sites found on a query, the user may specify sorting by relevance or sorting by site. The "sort by site" feature is a good way to find out how many different sites it really found because it will group together the sites that are just different pages of the same site (Excite).

Magellan, a subject directory site containing twenty-six subject categories, has

recently been acquired by Excite and now contains some features of Excite. Magellan contains "rated and reviewed sites," "yet to be reviewed sites," and "green light sites" as the choices to search. The "green light sites" are those free of content for mature audiences (Magellan).

Ultraseek by Infoseek provides a powerful search engine which is easy to use. It will allow boolean searches, but the default is to use natural language searching which allows, for example, a user to pose a query of plain English. It will search for phrases which are similar to the query. Ultraseek also has a feature which allows you to retrieve pages related to those it has found (Infoseek).

Infoseek provides Ultrasmart, a subject directory search engine. Ultrasmart has twelve categories which are searchable. If you don't find what you need, you may modify your search to search the web instead (Infoseek).

Lycos contains a search engine, and two subject directories (Sites by Subject and Top 5% Sites). One feature that differs from many other search engines is that although the engine does automatic word stemming the user may require the engine to search for an exact match through the use of a period (.) after the word (Lycos). (Ex. Education would normally get education and educational. Education. would get only education.) Sites by Subject are the top 10% of sites most linked to by users. The Top 5% Sites are those in the top 5%. Reviews are available for the Top 5% Sites. In addition to the sixteen subject categories, Lycos also provides current news, maps, city information, and a company database (Lycos).

Notable in Lycos is the new Companies Online database. Lycos has partnered with Dun & Bradstreet in creating this. Although it is not yet complete (as of Feb. 1997), it is worth a serious look for more information about companies than one would normally find on any of the search engines' pages.

One of the most popular directory search engines is Yahoo! It was one of the first large directories of this type and covers fourteen subject categories. Yahoo! like many of the other search engines is now including special features in addition to the subject categories. It is possible to see top headline news updated hourly (Today's News), search for news within the last seven days, and easily link to special search engines for companies and people (Yellow Pages, People Search) ("Yahoo Help").

Yahoo! has recently begun to offer Net Events which searches for upcoming events on the Internet such as links to broadcasts of C-SPAN, sports events with live audio, chat room events, and Fed Net America. Yahoo! allows an individual to set up a personalized start page through My Yahoo! A user specifies interests so that a customized page (My Yahoo!) will just display the appropriate subject headings, current news, stock quotes, etc. based on those interests.

Although too small to really be included in the same category as the major search engines, Cyberhound is a new search engine of only reviewed sites. It has such extensive search capabilities in the Expert Search option and has so much descriptive information that it is worth trying. Created by Gale Research, a well known publisher of reference works, Cyberhound currently contains information on 30,000 sites. The ratings system criteria are clearly defined for the areas of content, design, technical merit, and entertainment (Gale).

A chart presenting special subject features of some of the previously discussed search tools is included at the end of the paper.

Mega Search or Parallel Search Sites

There are many standard Web search services available, each with its own strengths and weaknesses. Users often need to repeat their queries using different services, which is time-consuming and awkward. Another level of service is becoming available which provides a single starting point for searching multiple search engine databases.

Some of these allow users to submit a query to multiple search engines one at time. Notable among this type are ALL-IN-ONE Search Page [www.albany.net/allinone/], CUSI [pubweb.nexor.co.uk/public/ cusi/cusi.html] and c/net's search.com [www.search.com].

Others, such as MetaCrawler, SavvySearch, and Infomarket Search submit a query to multiple search engines simultaneously. They do not maintain an index database, but query a number of existing free search engines and integrate the results. All-4-One [www.all4one.com/index.phtml] does a simultaneous query in AltaVista, Lycos, Yahoo, and WebCrawler, but it returns the results in four small frames of a cluttered screen rather than combining the results. More detail follows on the other three mega search or parallel search services.

MetaCrawler - www.metacrawler.com
An easy to use opening screen provides a query line and choice of searching for a phrase, all of these words, or any of these words. Users may also choose either a "fast" or a "comprehensive" search, but it is not clear what is meant by these choices. An option to search for a person's homepage using Ahoy!, which works very well, is also given on the first screen. The help page says searchers may use advanced syntax on the query line, including quotes for a phrase and + or - for requiring or excluding a term. MetaCrawler will use these features in the engines which support them.

It is not clear which specific search engines are included in the search. The help page says MetaCrawler sends a query simultaneously to "several web search engines, including Lycos, WebCrawler, Excite, Alta Vista, Yahoo, HotBot and Galaxy." Extra Functionality, which must be enabled from the "Configure" option, allows setting maximum results per source from 10 to 30; time limit from 1 to 5 minutes; and results from everywhere, a geographical area, or educational, commercial, or government sites.SavvySearch - guaraldi.cs.colostate.edu:2000/form

SavvySearch includes 19 search engines including those which search Web pages, Usenet Newsgroups, FTP sites, yellow pages and name directories, etc. It makes an "educated guess," using information from past searches, as to which engines will do best for the query and forms a "search plan." From two to five engines will be simultaneously searched, but other choices are available from the display of the plan.

The opening screen allows a choice of searching for all query terms, a phrase, or any term and retrieving from 10 to 50 results from each engine. Choose "Integrate Results" to eliminate duplicates and display the hits from all engines together. This takes a little longer. The query is sent exactly as entered to the different engines. There is no option for NOT nor for letter case.

Infomarket Search - www.infomkt.com/

Infomarket Search is a type of specialized mega search page. It is sponsored by IBM and appears to be aimed more at the business market. Users may search for free and may purchase information using IBM's special Cryptolope technology for this purpose.

This service simultaneously searches multiple commercial and Internet databases including over 75 newswires, 300 newspapers, 819 newsletters, 6882 journals, and 11

million companies in a variety of subject areas. There is little help available, but the screen is user friendly. There is no indication of how many hits were retrieved.

Specialized Search Engines

Sometimes a specialized search engine should be used to locate information. Specialized search engines focus on providing directories and/or search engines for one subject area. Since there are hundreds from which to choose, the following directories/engines are just a small sampling to indicate the variety available.
A directory of sources for finding email discussion groups (http://www.nova.edu/Inter-Links/listserv.html) is available at a page at Nova Southeastern University. Rob Kabacoff, who created and maintains the site (Inter-Links) of which this directory is a part, states in his site that it "was the first place on the Web that provided users with search engines for locating Electronic Mailing Lists, PC software, Usenet Newsgroups, E-mail Addresses, and GIF Images."

A Business Compass (ABC) (http://www.abcompass.com) is a new specialized search engine/subject directory of business research information ("A Business Compass Introduces" 41). According to the company, A Business Compass LCC, the editorial staff select sites that business people "can use for market research, industry data, news, analysis, and competitive intelligence" ("ABC Information"). As of this time, it searches exact keywords only. It has subject, industry, and geographic directories. Each site in ABC contains a description of the expected business use of the site, content description, special features, and direct links to specific valuable pages within the site as well as the home page of each site.

Of the many sites available for searching for phone numbers, email addresses, etc., one might try 555-1212.com (http://www.555-1212.com). It allows searching three different databases of phone numbers, a reverse phone number directory, yellow pages, fax directory (under construction), and a Toll-Free directory.
Argos is a search engine which claims to be the "first peer-reviewed, limited area search engine (LASE) on the World-Wide Web" (Beavers). It limits coverage to sites which contain information about the ancient and medieval world and which are approved by an editorial board. Although the board does not approve each page, each site as a whole must meet the board's approval.

Conclusion

If one needs to find preselected sites which are organized, described, and in some cases reviewed, one should search first in the subject directory search tools. Those looking for very specific items will need to search in one of the major search engines such as AltaVista, Excite, or InfoSeek's Ultraseek. If the searcher needs to be very thorough in the search process or if the searcher is seeking a hard to find item of information, one of the mega search engines could be selected. Information sought in a specific subject area may be found more easily with a specialized search engine or directory.
Each searcher should become familiar with the search techniques in this paper and in the help screens which are available at each search site. By selecting from among the different types of search tools available, understanding search concepts, and mastering the search techniques of several of the major search engines, a user should expect to obtain fairly successful search results.

Search Engines

	Alta Vista	**HotBot**	**Open Text**	**Webcrawler**
Web Address	altavista.digital.com	www.hotbot.com	index.opentext.net	http://webcrawler.com
		54 million		

Size	54 million documents	documents; claims to be the most complete index		
What part of Internet is included	Web pages & Newsgroups Choose from pull-down menu	Web pages and Newsgroups Choose from pull-down menu Full text.	Web pages, Newsgroups, email, & current events	Web pages, ftp, & gopher sites
What part of each page is included and searchable	Full text (but many stopwords). Can limit to title, parts of URL, & more.	Opening screen allows choice for date, location, media type. Location includes "cyberplace" which is host name & domain. Screen also has options to Modify and use Expert mode.	Full text; claims there are no stopwords. Power search pull-down menu for Page Elements include: Anywhere, Summary, Title, First-Level Heading	Does not index certain words which appear frequently nor combinations of letters and numbers.
Natural language searching	Yes	Yes Implied AND.	No- searches for every word	Yes
Limit by required and prohibited terms (Boolean Operators)	Implied OR. Use +/- in Simple Search; Use AND, OR, AND NOT in Advanced Search. Use parentheses for nesting in Advanced Search.	Pull-down menu offers: All the words, Any of the words, The exact phrase, The person, Links to this URL, The Boolean expressions. Use parentheses for nesting in Advanced Search.	Implied AND. Can search for "these words" or "this phrase." Power search pull-down menu offers: AND, OR, BUT NOT. No nesting.	Implied OR. Allows AND, OR, NOT. Use parentheses for nesting.
Limit by Proximity	NEAR=withing 10 words	No proximity, byt searching for a person uses a type of proximity.	Pull-down menu: NEAR=within 80 characters before/after. FOLLOWED BY = follows within 80 characters.	Allows Near with a switch to indicate how close (NEAR/20) and ADJ = together in order indicated.

Other Searching Features	Use quotes for a phrase. Truncation -- use * for up to 5 lowercase letters. All lowercase entries retrieve either upper or lower case; use of any capitalization limits to exact match.	Use quotes for a phrase or choose from menu under "modify" option. No truncation. Ignores letter case except in "interesting cases" such as NeXT which matches exactly.	No truncation. Ignores letter case.	Use quotes for a phrase. No truncation.
Refining searches/finding similar sites	Query remains in box for easy revision.	A "Revise Search" button available at bottom of results list.	Option to "Improve your result" displayed when results are returned.	Query remains in box for easy revision. Choose a button from the Summary display to search for similar pages.
Display of results	Displays 10 at a time; no limit. Choose display in standard or compact form. Relevance ranked-1st by location of terms and then by frequency. In Advanced Search user can control ranking.	Displays 10 hits at a time unless changed in pop-up menu. Gives score of relevancy determined by frequency first, then location.	Displays 10 at a time; no limit. Relevance determined by frequency and location. "Summaries" are given with links.	Choose to display 10, 25, or 100 hits at a time. Choose to display titles or summaries. Icoin shows relevance ranking determined by frequency.
Special features	Allows user to input words for use in relevance ranking in Advanced search. Can limit both Web and Usenet searches in a number ways using the name plus a colon (example-domain: edu)	Expert mode allows narrowing by site, domain, geographic location, or technology.	The "Discover" button offers cool sites, cartoons, columnists, and other special searches.	Includes summaries of sites produced by analyzing first 100 words. Searches for US cities link to map of the city. Also includes some subject category listings.
Why or when to use site	Excellent for searches for obscure topics using advanced techniques.	Easy to use menus make this a good choice for beginning users.	A good alternative to AltaVista and HotBot which are larger.	Easy to use and especially good for popular topics. Often busy.

	Excite	**Infoseek Ultraseek**	**Lycos**	**Yahoo!**
Web Address	www.excite.com	www.infoseek.com	www.lycos.com	www.yahoo.com
Size	50 million URLs	50 million URLs	70 million URLs	
		Web, Usenet		

What part of Internet is included	Web, Reviews, Usenet Newsgroups, NewsTracker (Click on Bullet to select)	Newsgroups, News Wires, Premier News(7 news sources on Web), Email addresses, Company profiles, Web FAQs	Web, Sounds, Pictures, and by Subject (Pull down menu)	Yahoo! sites, Usenet, Email addresses (in Search Options Screen)
What part of each page is included and searchable		Full Text. Search on any word, sites, links, URL,, title words.		Yahoo Categories, Yahoo web sites, Today's news, Net Events. Search for title words, by date added.
Natural language searching	Yes	Yes	No	No
Limit by required and prohibited terms (Boolean Operators)	Implied OR, accepts AND, AND NOT, OR, +, -	Implied OR, accepts +,0	Implied OR, accepts -. Custom Search will do AND, OR, match 2, 3, 4, 5, 6, 7 terms.	Implied AND, accepts +,-. Search option screen will do AND, OR.
Limit by Proximity	No		No	No
Other Searching Features	Use quotes for phrase, case sensitives	Use quotes for phrase or hyphens between words. Case sensitive, Capitalize proper names. Finds word variants (mouse, mice).	Use . at end of word for exact match. $ for truncation.	Use quotes for phrases. Case sensitive. * for truncation.
Refining searches/finding similar sites	Refind - Yes. Find similar sites with "More Like This"	Query remains in box and can choose "Search only under these results" to narrow. "Similar pages" feature.	Query remains in box, terms searched are displayed, and may choose to search those terms. May also choose to repeat searh in by Subject, Images, and Sound searches.	Query remains in box. Query can also be reivsed in Search Option Screen. Relevance ranked by

Display of results	Relevance ranked. User may specify sorting by sites.	Relevance ranked by location of terms, frequency, high weight (uncommon terms).	Relevance ranked. User may select display as summary, standard, or detailed and how many per page.	multiple keyword matches, location of terms, generality of category. User may choose Alphabetical order and may choose how many per page.
Special features	Excite Reviews, Reference categories, Personalized start page - Excite Live!, Newstracker (articles from over 300 newspapers and magazines).	Subject searching in Ultrasmart. Current news in News Center. Can search for images.	Advanced search screen - Custom Search. Subject category searching in Sites by Subject, and Top5 % Sites.	Net Events. Personalized start page - My Yahoo! Automatic link to Altavista if search not found in Yahoo!
Why or when to use site	Natural language searching, sort by sites featurem Reviews, Newstracker.	Natural language searching, ease of use, News Center.	Top 5% Sites, Sites by Subject, searching for images, Sounds.	Well-organized directory, Net Events, My Yahoo!

SUBJECT FEATURES OF SEARCH ENGINES

Features	Excite	Infoseek	Lycos	Magellan	Yahoo!
Finding People, Email Addresses	People Finder, Email Lookup	Big Yellow	People Find	People Finder, Email Search	People Search
Finding Companies	Bigbook Yellow Pages	Smart Info, Big Yellow	Companies Online, GTE SuperPages	Bigbook Yellow Pages	Yellow Pages
News, Weather	NewsTracker, Excite Live!	News Center, Personalized Info.	Top News	Excite Live!	Today's News, Yahoo! Weather
Business News	News Tracker	News Center	Top News	Excite Live!	Today's News
Stock Quotes	Excite Live!	Smart Info	Stock Find	Excite Live!	Stock Quotes
Regional Info, Maps	City.Net	Smart Info	City Guide, Road Maps	City.Net	Regional (subject), City Maps
Name of Subject Directory, Number of Sites	Excite Reviews, 60,000 reviewed	Ultrasmart	Top 5% Sites, Sites by Subject	Magellan, 40,000 reviewed, 15 million total	Yahoo!
Reviews, Ratings	Yes, Yes	No, Yes	Yes, Yes	Yes, Yes	No, Yes
Subject Categories	20	12	16	26	14
Education Subtopics	14	15	7	34	32

WORKS CONSULTED

"A Business Compass Introduces Guide to Business Information on the Internet." Information Today Feb. 1997: 41.

A Business Compass, LLC. "ABC Information." 1997. <http://www.abcompass.com/info.html> (18 Feb. 1997).

AltaVista. "Help for Advanced Queries Only." 1997. <http://altavista.digital.com/cgi-bin/query?pg=ah> (17 Feb. 1997).

AltaVista. "Help for Simple Queries Only." 1997. <http://altavista.digital.com/cgi-bin/query?pg=h> (17 Feb. 1997).

Bates, Mary Ellen. "The Internet; Part of a Professional Searcher's Toolkit." Online Jan./Feb. 1997: 47-52.

Beavers, Anthony F. and Hiten Sonpal. "Argos:Limited Area Search of the Ancient and Medieval Internet: About Argos." 1997. <http://argos.evansville.edu:80/about.htm> (21 Feb. 1997).

Brandt, D. Scott. "What Flavor is Your Search Engine." Computers in Libraries Jan. 1997: 47+

Duval, Beverly K. and Linda Main. "Searching on the Net: General Overview." Library

Software Review Winter 1996: 242-251.

Excite Inc. "How to Use Excite Search." 1996. <http://www.excite.com/Info/searching.html?a-n-t> (11 Feb. 1997).

Gale. "Cyberhound Online Help." 1997. <http://www.thomson.com/cyberhound/help.html> (15 Feb. 1997).

HotBot. "Help." 1997. <http://www.hotbot.com/Help/> (16 Feb. 1997).

IBM infoMarket. "About infoMarket." 1997. <http://www.infomarket.ibm.com/ht3/info.shtml> (15 Feb. 1997).

Infoseek Corporation. "Help Table of Contents." 1997. <http://www.infoseek.com/Help?pg=DChelp.html> (15 Feb. 1997).

"Internet Search Tool Details." 1996. <http://sunsite.berkeley.edu/Help/searchdetails.html> (2 Feb. 1997).

Kabacoff, Rob. "E-Mail Discussion Groups." Inter-Links. 1996. <http://www.nova.edu/Inter-Links/help/brag> (20 Feb. 1997).

Kennedy, Shirley Duglin. "Internet Waves: The Internet as a Communications Tool." Information Today Feb. 1997: 39+

Lycos, Inc. "Help: Answers to Common Questions." 1997. <http://www.lycos.com/help.html> (13 Feb. 1997).

Magellan. "Frequently Asked Questions." 1997. <http://www.mckinley.com/feature.cgi?faq.bd> (13 Feb. 1997).

MetaCrawler. "About our Service." 1997. <http://www.metacrawler.com/about.html> (13 Feb. 1997).

Notess, Greg R. "Comparing Net Directories." Database Feb./Mar. 1997: 61-64.

Open Text Index. "How to Use the Open Text Index." 1997. <http://index.opentext.net/main/help.html> (19 Feb. 1997).

Rothman, Howard. "The Ultimate Search Guide." Online Access Jan. 1997: 39-43.

Schurman, Kyle. "Search Engines & Web Directories." PC Novice Guide to Going Online Vol. 5, #3, 1997: 76-79.

SavvySearch. "Help." 1997. <http://guaraldi.cs.colostate.edu:2000/help/> (16 Feb. 1997).

SavvySearch. "Frequently Asked Questions." 1997. <http://guaraldi.cs.colostate.edu:2000/faq/> (16 Feb. 1997).

Seltzer, Richard, Eric J. Ray, and Deborah S. Ray. The AltaVista Search Revolution: How to find anything on the Internet. Berkeley: Osborne McGraw Hill, 1997.

Singh, Amarendra, and David Lidsky. "All-Out Search." PC Magazine 3 Dec. 1996: 213+.

Yahoo! "Yahoo! Advanced Search Syntax." 1997. <http://search.yahoo.com/search/syntax?> (14 Feb. 1997).

Yahoo! "Yahoo! Help on Search." 1997. <http://search.yahoo.com/search/help?> (14 Feb. 1997).

WebCrawler. "Help." 1997. <http://www.webcrawler.com/WebCrawler/Help/Help.html> (13 Feb. 1997).

[TOP]

A Strategy for Helping Faculty Create Course Web Pages

Fred Janzow and Larry Summary

- Abstract
- A Strategy for Helping Faculty Create Course Web Pages
- Meeting With Faculty Member Clients
- Graphic Design
- Navigation
- For More Information

Abstract

This paper summarizes a project to help faculty develop web pages for courses. Most faculty do not have the time or the expertise to learn principles of designing effective graphic images and efficient navigation systems for web pages. To assist faculty in developing web pages, the CSTL created design teams consisting of undergraduate graphic design and computer science majors who work with the Center's staff and faculty members to design and create course web pages. A graphic design student and a computer science student work together to produce professional quality web pages that meet faculty's needs regarding content and interaction.

A Strategy for Helping Faculty Create Course Web Pages

In 1996 the Center for Scholarship in Teaching and Learning (CSTL) embarked on a Technology Serving Learning project designed to help faculty learn how to integrate information technology with courses in ways that effectively support student learning. This project included purchasing hardware with the capacity to support significant multimedia development work, offering seminars and workshops designed to introduce faculty to using the World Wide Web (WWW) as an instructional tool, and developing a system for helping faculty create course web sites with professional quality graphic design and navigation. This presentation focuses on the implementation of the course web sites project.

In implementing the project, the CSTL staff prepared by finding information about web site design, examining many educational and commercial web sites, and then designing a procedure for discussing with instructors courses they teach. Evaluation of commercial and educational web sites showed that the quality of graphic design and navigation varied greatly. Indeed many sites seemed not to meet good standards of effective graphic design and navigation. From this we learned several principles of web site design that became the basis the CSTL's approach to creating course web sites. These are summarized below.

In considering how best to help faculty understand the ways in which a web site might serve courses they teach, we developed an explanation that focused on three aspects of the WWW environment. We explain to instructors that they must reexamine the structure, content, and learning objectives of courses in light of the fact that the WWW offers four major advantages to course delivery: multimedia delivery of info; access to Internet information resources; increased opportunities for communication; convenience

of access. With the help of the CSTL staff, instructors consider how these advantages might be incorporated into their courses in ways that will support the learning experiences of students.

The procedure created to work with faculty includes several critical steps. In phase I , the CSTL staff meets several times with an instructor, who has expressed interest in developing a course web site, to discuss the curricular role, academic content, learning objectives, learning materials, typical in-class activities, range of assignments, and typical evaluation tactics of the course. Usually, this step takes several meetings to insure that the CSTL staff develops an accurate understanding of the course and its delivery. During these discussions, the instructor as well develops insights about the course. Indeed, one of the unexpected benefits of the web site project is that an instructor's reexamination of the structure, content, and delivery of a course results in better understanding of her or his philosophy about learning and approaches to teaching.

In phase II the CSTL staff and the instructor decide what objectives and components of a course will be best served by a web site. At the outset, instructors often simply want to scan the text and diagrammatic handouts they use in class and make them available for reading or downloading. This, of course, is possible (barring copyright problems) but does not take advantage of the real power of the WWW environment. In this circumstance, the staff explains again the major advantages that a web site can offer, emphasizing multimedia, communication, and convenience. For example, the staff and instructor often talk about how it may be a more powerful learning experience to reconsider how to use a reading by designing specific interactive learning experiences which require the students to respond to a reading on-line by submitting questions about the reading, by completing an assignment using a form that is submitted to the instructor electronically, or by participating in an on-line chat or asynchronous listserve discussion about the reading. These options help the instructor to think differently about reading assignments and how one might design on-line experiences that better support student learning. This usually leads to further reconsideration of much of the content and delivery of a course. After finishing these discussions, some course materials and activities are left in the traditional format and others are designated for inclusion in the course web page. Finally, the CSTL and instructor spend time identifying other web links that might be incorporated into the course web page to support assignments and other course content.

In phase IV, the staff and instructor develop a map of the site. This is pen-and-paper work done on a large flip chart. The underlying principle in developing this map is ease of navigation through the pages of the web site. Components of the course are grouped on the basis similarity of content or function, linked by lines, and then these are linked to a main directory that will appear on the first screen of the home page. Once the map is completed, it becomes the template for programming the course web page.

In phase V, the staff creates at least two alternative versions of the basic course web page. These alternative versions usually differ in the graphic design and navigation system used to present and use the web page. The instructor then meets with the design team to evaluate the alternative versions and chooses one version or opts for combining components of different versions into a single web page. The content of the course then gradually is added to the selected basic framework for the course web page and reevaluated several times for ongoing revision until the page is ready for publication on the web.

To implement the course web sites project, the CSTL staff decided to hire advanced undergraduate graphic design majors and computer science majors to form web page design teams. The CSTL assigned one graphic design student, one computer science student, and one or two CSTL staff members to each course web page project . Each design team meets with an instructor, who wants to develop a course home page, and

discusses the course and appropriate graphic designs and navigation systems for the page following the phases described above. The CSTL staff trains the student workers to act professionally, to work towards specific graphic design and navigation standards, and to remain sensitive to the fact that their task is to serve the best interests of the instructor and students. Each student receives a written set of suggestions and standards for creating a course home page:

Meeting With Faculty Member Clients

When you meet with a faculty member to discuss the design of a course web site, there are several important principles to follow:

_ Know the faculty member's name and how to pronounce it, the location of her or his office, and the academic department to which he or she belongs.

_ Be on time. Because faculty members have busy schedules and significant work loads, we want them to know that we understand the value of their time. If for some legitimate reason you must be late for or can not meet an appointment, call the client and inform her or him about the situation.

_ At the first meeting, introduce yourself and spend a little time conversing with clients to learn about them. This will give you a better sense of clients' expertise with computers and comfort with developing a course web site.

_ Communicate in nontechnical language. Find words and ways to explain technology simply and with metaphors referring to common things and experiences. BUT, DO NOT speak down or condescendingly to a client. This requires a careful approach to communication. It will help if you spend time in your initial meetings assessing the client's familiarity with technical aspects of graphic design, computer technology, and the World Wide Web.

_ Pace your explanations. Otherwise, because you are familiar with graphic design and computer technology, you may go too quickly, assuming that the client understands underlying concepts and ideas. Ask often if anything seems confusing or if the client has any questions.

_ At the end of appointments, always thank clients for their willingness to work on the course web page project and invite them to contact us if they need anything. At the end of your first visit with clients, make sure you leave your name, email address, and the CSTL campus extension (2298) with them.

_ Be a good listener. Your task is to listen carefully enough that you will understand the client's needs and what they think is important. Your role is to serve the client's needs.

Graphic design

_ Overall graphic presentation must be aesthetically pleasing, following sound principles of graphic design.
_ Include an institutional logo bar at bottom of each page.
_ Develop a graphic theme consistent with course content and image.
_ The graphic theme should be present on the first screen of each section of a web page.
_ Differentiate between graphics important for presenting a site and those important for student learning.

_ Graphic symbols should support easy navigation through a course home page.
_ Use graphics only when they directly support presentation of the web page or course content.
_ Keep graphic images to approximately 32-45K.
_ Remember that the campus standard for graphics is 256 colors.

Navigation

_ Make finding information about a course as simple and quick as possible.
_ Use graphics to let users know where they are in a site.
_ Every page should permit returning to main screen of a section or main "splash" screen of the web page.
_ Use text instructions that are succinct and precise.
_ Make underlying source code for the navigation system efficient and easy to modify.
_ Minimize the number of "clicks" or pages user must "turn" to get to a destination.
_ First screen of a web page must present graphic and text information without the need to scroll down.
_ Always view work in several browsers to insure best visual presentation to the most users.
_ Remember that users may be viewing the page on either a 640x480 screen or a 1024x768 screen setup.
_ Remember that the web site environment is not linear, but is a network; thus users may enter a course web page at several entry points.

Using student expertise to help faculty learn to integrate information technology with teaching and learning is not only economical, but also provides other substantial benefits to both the instructors and the students. Instructors learn about information technology in a relatively unthreatening way and at a pace that they determine. They remain in control of the content of their course web page and are relieved of the burden of having to understand principles of graphic design and html programming. Instructors additionally have easier access to student help than they would to an already overburdened professional staff in computer services.

The students gain as well. By working with a design team, they learn important professional skills that can be applied in jobs they take after graduation. They also learn ways to apply principles of graphic design and programming which had been somewhat abstract before working with faculty clients who have specific needs and preferences regarding the appearance and content of their course web pages.

For more information

Contact the authors at:

Fred Janzow Phone: (573)651-2298 E-mail: c409scb@semovm.semo.edu

Larry Summary Phone: (573)651-2807 E-mail: c297hut@semovm.semo.edu
[TOP]

Interactive Television vs. a Traditional Classroom Setting: A Comparison of Student Math Achievement

Sherri Hodge-Hardin, Ph.D.

- Abstract
- The Problem
- Purpose
- Significance
- Methods
- Conclusions
- Recommendations
- References

Abstract

While a dramatic expansion of distance learning through the use of interactive television (ITV) is allowing colleges and universities to offer students potentially unlimited access to educational opportunities, the question may be raised --- Is ITV an effective medium of instruction? The purpose of this study was to determine if there were differences in math achievement of students taught in an ITV class setting with the instructor present (host site), students receiving instruction via television at an off-campus location (remote site), and students taught in a traditional classroom setting. This study also examined student attitudes toward enrolling in future ITV courses.

The Problem

Recent technological advances, as well as changes in demographics among student populations, have made television an increasingly viable medium for the delivery of university curriculum (Jacobson, 1994). As more university courses become available via interactive television systems in the future, research focusing on instructional practices in televised classrooms will have greater utility. This study was designed to investigate the effects of using interactive television (ITV) asa means of teaching developmental algebra at East Tennessee StateUniversity (ETSU).

Purpose

This study focused on the achievement of three groups of developmental algebra students. The purpose of the study was to determine if there were differences in math achievement of students taught in an ITV class setting with the instructor present (host site), students receiving instruction via television at an off-campus location (remote site), and studentstaught in a traditional class setting. This study also compared traditional students and nontraditional students to see if there were differences in achievement based on age. Finally, this study tried to determine if students who enrolled in a developmental algebra course taught via interactive television would consider taking another ITV course in the future, and if they would consider taking another ITV math course in the future.

Significance

Any new method of instructional delivery requires assessment to determine the strengths and weaknesses of the system. Technology applied to education produces a greater need to evaluate outcomes to provide evidence that students in ITV classrooms will achieve as well as those students taught in traditional classrooms. If the system fails to achieve these goals, the method of delivery needs to be reconsidered. The use of interactive television to offer courses at remote locations holds promise for being an exciting method of reaching more students than would generally be able to attend if classes were restricted to lecture halls and classrooms on campus (Fulmer,Hazzard, Jones, & Keene, 1992). If it can be shown that the students at the distance learning sites are learning as well as those students in the traditional classrooms, then there would be empirical evidence that ITV should be considered as an adequate method of providing instruction beyond the campus.

Methods

For the purposes of this study, the sample was made up of all developmental students at ETSU enrolled in an Introductory Algebra or an Intermediate Algebra course taught via ITV during the following seven consecutive semesters: Spring 1993, Summer 1993, Fall 1993, Spring 1994, Summer 1994, Fall 1994, and Spring1995. The researcher was the instructor for all of these classes. The sample also included developmental students at ETSU enrolled in an Introductory Algebra course or an IntermediateAlgebra course taught in this instructor's traditional classrooms during these same semesters. Over the period of these seven semesters, 189 students were enrolled in the Introductory Algebra course under investigation, and 112 students were enrolled in the Intermediate Algebra course under investigation. Of the 189 Introductory Algebra students, 89 were traditional age (22 and younger) and 100 were nontraditional age (23 and older). Of the 112 Intermediate Algebra students, 42 were traditional age and 70 were nontraditional age. Tables 1 and 2 give the enrollments by student age and method of instructional delivery for the Introductory and Intermediate Algebra courses.

Table 1
Introductory Algebra Enrollment by Student Age and Method of Instructional Delivery

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	32	15	42
Nontraditional Age	43	26	31
Totals	**75**	**41**	**73**

Table 2
Intermediate Algebra Enrollment by Student Age and Method of Instructional Delivery

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	15	11	16
Nontraditional Age	19	19	32
Totals	**34**	**30**	**48**

The students in this sample were given math instruction by the same instructor at one of three sites:

Group 1 - ITV Host Site - This was an interactive television studio (housed in room 123 Sam Wilson Hall) located on the main campus of ETSU. Students in this setting were given instruction in a room equipped with cameras and microphones at each desk. The instructor was physically present with these students. Math instruction was given on camera, with the students seeing the

problems worked by the instructor on two overhead television screens. Instruction originated in this on-campus studio and was transmitted to another group of students at the ETSU/UT Kingsport Center in Kingsport, Tennessee.

Group 2 - Remote Site - The students in Kingsport were the second group in the study. They were part of this live, interactive instruction. They could talk to the instructor via cordless telephone at any time during the class. The students in Kingsport saw (via television) and heard everything that was going on in the on-campus studio. However, the students and the instructor at the on-campus site could only hear the students in Kingsport (two-way audio but only one-way video). A faculty assistant was always present with the students at the ITV remote site. This person monitored the television equipment, kept class attendance records, and proctored exams.

Group 3 - Traditional Classroom - Students in this setting were taught algebra in a regular classroom. The teacher was present with the students and instruction was given utilizing the chalkboard.

Students were placed in either the Introductory Algebra or Intermediate Algebra course based on their score on the Academic Assessment and Placement Program (AAPP) exam (TBR AAPP Student Information Bulletin, 1994). As a second check in making sure students were placed properly, a 10-problem proficiency test was given on the first day of each class. This test covered the objectives that would be taught throughout the semester. Student scores on this proficiency test could range from 0 to 100. If students scored 70% or higher on the exam, they were "bumped up" to the next level math course. This proficiency exam helped to ensure that students were equitable mathematically from the beginning of the course. The proficiency exam scores were used as a covariate in the study to control for any preexisting differences among groups prior to the research. Students in all classes were given four exams and a comprehensive final, each of which comprised 20% of the student's grade. Exams for each class were graded by the instructor. Final grades were calculated for each student in all classes based on a 100-point scale. This numerical final grade was used as a dependent variable in determining the effectiveness of these ITV courses.

Student attitude toward taking another ITV course was another dependent variable in the study. During the final exam, students enrolled in the ITV classes were asked to check 'yes' or 'no' to two questions: (1) Would you take another math class taught via interactive television? and (2) Would you take any other class taught via interactive television?

A two-way analysis of variance with one covariate (ANCOVA)was used to determine if differences in student achievement existed among the three instructional sites. The ANCOVA procedure was also used to determine if differences in student achievement existed among the three instructional sites when comparing traditional age students with nontraditional age students. Student achievement was measured by the final course grade and was ratio level data. The parametric ANCOVA procedure is appropriate when attempting to find significant differences among three or more groups using ratio level data (Hinkle, Wiersma, & Jurs, 1988). A covariate was used to control for any preexisting differences among groups prior to the research. The covariate was each student's proficiency test score.

Results for Introductory Algebra
Table 3 presents the results of the ANCOVA for Introductory Algebra.

Table 3
Analysis of Covariance on Final Course Grade by Group and Age for Introductory Algebra

Source	SS	df	MS	F	p
PROFTEST	31066.82	1	31066.82	14848,47	<.0005
GROUP	7.32	2	3.66	1.75	.177
AGE	.23	1	.23	.11	.739
GROUP by AGE	.72	2	.36	.17	.843
error	380.79	182	2.09	---	---

There were no significant differences in student achievement in Introductory Algebra using three different methods of delivering instruction. There were also no significant differences in student achievement among the three groups when comparing traditional age students with nontraditional age students. Tables 4 and 5 give the Observed and Adjusted group means for Introductory Algebra as calculated by the ANCOVA procedure.

Table 4
Observed Group Means on Final Course Grade for Introductory Algebra

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	87.231	87.800	82.286
Nontraditional Age	83.714	83.577	85.548

Table 5
Adjusted Group Means on Final Course Grade for Introductory Algebra

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	87.248	87.652	82.328
Nontraditional Age	83.705	83.662	85.491

As can be seen from Table 4, the traditional age students at the ITV remote site in Kingsport had the highest group mean (m = 87.652) for Introductory Algebra. The traditional age students in the traditional classroom setting had the lowest group mean (m = 82.328) for Introductory Algebra.

Student Attitudes Toward ITV in Introductory Algebra

Students at both the ITV host site on campus and the ITV remote site in Kingsport overwhelmingly checked yes to taking future ITV classes and future ITV math classes. Tables 6 and 7 give the results of Introductory Algebra student responses toward future ITV participation.

Table 6
Introductory Algebra Student Responses Toward Taking Another ITV Class

	ITV Host Site	ITV Remote Site
Students Responding YES	75	40
Students Responding NO	0	1
Percentage Responding YES	100	97.6
Percentage Responding NO	0	2.4

Table 7
Introductory Algebra Student Responses Toward Taking Another ITV Math Class

	ITV Host Site	ITV Remote Site
Students Responding YES	75	39
Students Responding NO	0	2
Percentage Responding YES	100	95.1
Percentage Responding NO	0	4.9

Results for Intermediate Algebra
Table 8 presents the results of the ANCOVA for Intermediate Algebra.

Table 8
Analysis of Covariance on Final Course Grade by Group and Age for Intermediate Algebra

Source	SS	df	MS	F	p
PROFTEST	13969.38	1	13969.38	6071.19	<.0005
GROUP	2.71	2	1.36	.59	.556
AGE	.05	1	.05	.02	.888
GROUP by AGE	7.33	2	3.67	1.59	.208
error	241.60	105	2.30	---	---

There were no significant differences in student achievement in Intermediate Algebra using three different methods of delivering instruction. There were also no significant differences in student achievement among the three groups when comparing traditional age students with nontraditional age students.
Tables 9 and 10 give the Observed and Adjusted group means for Intermediate Algebra as calculated by the ANCOVA procedure.

Table 9
Observed Group Means on Final Course Grade for Intermediate Algebra

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	89.533	84.909	82.438
Nontraditional Age	87.474	92.105	83.562

Table 10
Adjusted Group Means on Final Course Grade for Intermediate Algebra

	ITV Host Site	ITV Remote Site	Traditional Classroom
Traditional Age	89.107	85.071	82.725
Nontraditional Age	87.809	92.011	83.419

As can be seen from Table 10, the nontraditional age students at the ITV remote site in Kingsport had the highest group mean (m = 92.011) for Intermediate Algebra. The traditional age students in the traditional classroom setting had the lowest group mean (m = 82.725) for Intermediate Algebra.

Student Attitudes Toward ITV in Intermediate Algebra

Students at both the ITV host site on campus and the ITV remote site in Kingsport overwhelmingly checked yes to taking future ITV classes and future ITV math classes. Tables 11 and 12 give the results of Intermediate Algebra student responses toward future ITV participation.

Table 11
Intermediate Algebra Student Responses Toward Taking Another ITV Class

	ITV Host Site	ITV Remote Site
Students Responding YES	33	29
Students Responding NO	1	1
Percentage Responding YES	97.1	96.7
Percentage Responding NO	2.9	3.3

Table 12
Intermediate Algebra Student Responses Toward Taking Another ITV Math Class

	ITV Host Site	ITV Remote Site
Students Responding YES	33	29
Students Responding NO	1	1
Percentage Responding YES	97.1	96.7
Percentage Responding NO	2.9	3.3

Conclusions

1. Students at the distant learning site in Kingsport performed as well as the students in the traditional classroom in both Introductory and Intermediate Algebra courses.

2. In Introductory Algebra, traditional age students at thedistant learning site in Kingsport had a higher group mean on the final course grade than did students in the traditional classroom setting.

3. In Intermediate Algebra, nontraditional age students at the distant learning site in Kingsport had a higher group mean on the final course grade than did students in the traditional classroom setting.

4. Students in both Introductory Algebra and Intermediate Algebra had positive attitudes toward future participation in interactive television courses.

5. The results of this study give empirical evidence that ITV should be considered as an adequate method of providing developmental algebra instruction beyond the campus.

Recommendations

To determine the applicability and validity of distance learning through ITV, additional research is required. Questions that could be posed in future studies include:

1. To what extent to corresponding studies of other ITV systems find similar or disparate results?
2. How does the role of interaction between distant students and the instructor relate to student achievement?
3. What are the cost benefits of the various distance education media as these relate to institutional budgeting?
4. What are the skills required for effective distant teaching?
5. Are distant teaching skills different from the skills required by the traditional on-campus instructor?
6. What institutional policies support or hinder distance teaching?

References

Fulmer, J., Hazzard, M., Jones, S., & Keene, K. (1992).
Distance learning: An innovative approach to nursing education.
Journal of Professional Nursing, 8(5), 289-294.
Hinkle, D. E., Wiersma, W., & Jurs, S. G. (1988). Applied statistics for the behavioral sciences (2nd ed.). Boston: Houghton Mifflin.
Jacobson, R. L. (1994, July 6). Extending the reach of
virtual' classrooms. The Chronicle of Higher Education,
pp. A19-A21, A23.
TBR AAPP student information bulletin. (1994). [brochure]. Nashville, TN: Tennessee Collaborative for Educational Excellence.

[TOP]

[Mid-South Instructional Technology Conference Home Page] [Proceedings 1997]

Best Case Practices of Technology at Eastern New Mexico University

Calvin W. DeWitt, Ph.D.

Scott Nutter, Ph.D.

Mary Ayala, Ph.D.

Debra Hall

- Abstract
- Overview
- Facilities and Services
- Current Challenges
- Examples and Experience
- Extending Technology Used in Modern Languages to Other Fields
- Business School Applications and Experience
- Simulations in Science
- ITV
- Conclusion

Abstract

Eastern New Mexico University (ENMU) has been a front-runner in the use of technology to solve teaching and learning problems. In this paper, examples of best case practices of technology being used in classes at ENMU will be presented. The examples include successful and not so successful applications, with insights on the overall process of incorporating technology into the classroom. This paper focuses on the experience of the authors in languages, business, and science, while the presentation, which includes a short video, is a more general overview with examples. The pedagogical and epistemological impact that technology has made in courses in these areas is discussed.

Overview

Eastern New Mexico University is considered a leader in technology among small liberal arts institutions. Although the university is located in rural New Mexico and has a student body of only 3400 FTE, ENMU was one of the twelve original members of the AAHE national Teaching, Learning and Technology Round table (TLTR). Through our participation in the TLTR, we have found that our particular approach to establishing the use of technology in the classroom is unique, partly because we realize that the term "technology" is not merely a synonym for "computer." Indeed, many innovative teaching ideas utilize technology other than computers.

There are other key factors which contribute to our unique approach at Eastern. In particular, we are especially fortunate to have an administration that is committed to the incorporation of appropriate technology in our classrooms, a strong and supportive campus TLTR, and a network of faculty who are willing to share ideas on how to use technology effectively in our teaching and our research. Specifically, over the past three years, the administration has provided the institutional funding and

support needed to set in place several crucial foundations upon which the utilization of technology is based. A state-of-the-art on-campus center with student-accessible computers and software was constructed. Additionally, a competitive internal grant program, overseen by the TLTR, was established to provide faculty with the technology tools needed to implement their new teaching ideas.

However, educators sometimes use technology for all of the wrong reasons, and the impact on student learning may lead to disappointing results. After all, using technology for technology's sake is inappropriate. When we search for an appropriate teaching tool -technology based or not-- we must first identify the nature of the concept we are trying to teach. We can then determine the outcomes we are trying to achieve and consider how can we assess those outcomes. It is also important to define which learning/teaching modes are best suited for each portion of material, and then, finally, ask ourselves how technology can be used to assist in "presenting" the material in a manner that best fits the diverse learning styles of our students. Even when we devote careful consideration to this process, we can still have failures; however, our experience is that successes are greatly multiplied if we follow the above approach. Also, this method allows us to develop the basis for transferring successful applications of technology to other disciplines and courses. Thus we can answer the question, "Is music happening or do we just hear chopsticks?"

Facilities and Services

Currently our campus computer facilities contain a computer for every 12 students. The library and some of the residence halls provide areas with additional computers for student use. In addition, the new computer center includes presentation rooms specifically designed for incorporating technology in teaching. Each of these rooms seats approximately 30 people and is equipped with an array of teaching devices, such as a projection device which can display the screen of a networked computer, an overhead projector, and a VCR. Moreover, there are several rooms that filled with Windows 95 based machines and another room with PowerMacs.; all are connected to the Internet. Two of these rooms can be reserved by faculty for teaching classes needing hands-on experience at the computer. All of the key instruction buildings on campus have ITV rooms that are fully equipped for distance learning. The design of these rooms is constantly changing as technology improves and as faculty feedback pinpoints specific needs or possible problem areas.

For "casual" technology applications which do not require computers, we have a Media Services Center. This Center, housed in the library, provides slide projectors, overhead projectors, In-Focus machines with computers, video players and TVs all delivered to the classroom of your choice in your hour of need. For the more technologically inclined, the Computer Center can provide you with a laptop computer for use on or off campus. While some of this may sound Utopian, it is important to point out that we still experience occasional problems. For example, not every classroom is accessible to the equipment delivery carts; and, some classrooms were not designed for the use of a free standing TV or computer, and do not have sufficient space in the front of the class to place one with its cart.

In the area of support, our Computer Center periodically offers free classes to faculty, staff, and students on a variety of technology topics that range from maneuvering in to accomplishing advanced research on the Internet. For faculty and staff with particular needs or a conflict which prevents attending the appropriate workshops, a "House Call" can be scheduled in which a Computer Center technician will come to your workplace and personally help you to do or learn your task.

Current Challenges

Despite all this equipment and easy access to help, we have found that merely providing faculty with technology and the know-how to use it does not necessarily lead to the incorporation of technology in the classroom throughout campus. Some individuals have proven themselves to be adept at adapting the new technology to their classroom needs, while others do little more than take advantage of the offer to acquire bigger, better hardware. Challenges at the inception of our TLTR included efforts that focused on providing the innovators with the (usually) expensive tools for them to test their ideas. Later, as more faculty began to introduce technology into the classroom, our primary focus switched from providing tools to disseminating ideas. We have not yet been able to fully establish that bridge between the early

adopters and the mainstream. However, to facilitate the growth of ideas of the use of technology in the mainstream, we are currently attempting to disseminate examples of appropriate uses of technology and to point out to faculty how each example, while it originate in a field that is different from theirs, can be used to address similar teaching and learning problems that they might be experiencing. In other words, while the subject is different, the method or approach could very well be the same.

It is in this much-needed dissemination of ideas that we have met our greatest challenge to date. Many technological tools are highly transferable among seemingly unrelated disciplines. Therefore, we need to encourage all faculty, regardless of their discipline, to keep in mind some simple guiding principles when considering the relative benefits of various technological tools for the classroom: 1) using technology for technology's sake should never be the goal; 2) technology is not just glitter and great sound effects. Often, relatively unsophisticated technology, such as the judicious use of an ELMO or video clips, can prove to be quite effective; and 3) the best rule of thumb is to analyze the pedagogical task at hand and to choose the technology which best addresses the problem. When doing this, we should never be bashful about "borrowing" ideas from colleagues in other disciplines.

Examples and Experience

The manners in which technology is being utilized in teaching at ENMU are far too many to enumerate. Accordingly, we will briefly mention a few approaches that have been used on our campus in order to exemplify the wide variety of strategies instructors have taken. More specifically, we will focus on languages, science, business, and distance learning (the fields of expertise of the authors) to offer several more detailed examples.

Many music, theater, and dance instructors in our College of Fine Arts use sophisticated video taping equipment to record student performances for later critique (posture or fingering techniques, for example) or to provide immediate feedback with closed-circuit display. Many of the science instructors utilize CDROMs in classes and laboratories to enhance understanding through simulations, multimedia clips, and/or a wide selection of images. The nursing program has a computer with a laser disk player for the main campus and every ITV instruction site. This disk is specific to nursing and interactively teaches students to perform basic procedures through drill and practice. Listservs are routinely used in a variety of classes to enhance and continue discussion beyond the physical and temporal limitations of the classroom. One instructor who uses this tool has commented that the student who is quiet in class is not always so reserved in front of a keyboard. Similarly, e-mail has become a regular and important part of faculty and staff daily communication. While there is currently only one completely web-based class taught at ENMU, many classes have material available on the Web, such as syllabi, homework assignments and solutions, and pages with links to relevant material on the Web.

Video equipment has been used effectively in many courses as a vehicle for delivering student presentations. If, when giving a report or presentation, students have the option of submitting a video instead of performing live, most manage to achieve a more polished and organized end product with less wasted classroom time and more quality control. In addition, they often spend more time and conscious effort preparing the presentation. Of course, a downside to this approach is that it that "shelters" the student from the type of live, face-to-face interaction which they are most likely to encounter in the workforce, and students must learn to deal with snafus when they occur and there is no option to edit them out.

All of these applications of technology in the classroom are fascinating, but they are not very useful in isolation. The following sections will explore the manners in which specific solutions can be translated into models that will easily cross disciplinary lines.

Extending technology used in Modern Languages to other fields

A little thought and imagination go a long way when trying to generalize a specific use to other fields. The teaching of modern languages is a perfect case in point. Many theorists argue that language learning belongs in a category of its own, apart from all other types of learning, and the very least, many of us in higher learning (not just in languages) strongly resist the idea that our discipline is anything but special.

Still, we are doing a disservice to our students and to ourselves if we refuse to recognize the many ways in which technology can be adapted to address similar learning situations in a variety of disciplines. Here are a few such universal strategies, all of them very simple, which have been adapted effectively in the language classrooms at ENMU.

1. Special language-learning software which allows students to focus on weak points and practice mechanical skills is a great tool for first-year students. At ENMU, we make these programs available to students at the Activities Center of our library, and we will soon have a new Writing/Language Lab open for student use. When combined with the audio cassette programs, videos, and specific software included with most contemporary language textbooks, this gives the student ample opportunity for reinforcement of their language skills. Theoretical background Even some of the more recent rationalist proponents in linguistics, those who espouse an essentially natural approach to language acquisition, recognize that the formal structure of a language classroom is most advantageous to beginning students. This is because novices do not yet possess even the most basic skills needed to perform the complex creative and critical tasks of speaking another language. Furthermore, behaviorists feel that overlearning is the only effective type of language-learning. Reinforcement of language skills through drill and practice, as well as the repetitive association of a given stimulus with the appropriate response, is obtained through the use of this type of language software. Transferring the tool: Task-specific software programs, commercially available or developed by an instructor for a specific course, can be useful in any situation where the student needs to develop and perfect the skills needed to perform the basic tasks in that field. This is the perfect opportunity for reinforcement outside of the classroom, or to afford individualized attention to the student for whom contact time in the classroom is not sufficient for developing these skills. This type of tool is good for honing the mechanics of a discipline, but it is generally not useful in developing critical or creative skills. (In languages, for example, most high intermediate and advanced students quickly become bored when using drill-type software.)

2. Pronunciation programs are a helpful tool at all levels, especially for students who respond most readily to oral/aural stimulus. Theoretical background: Educators have long recognized that learners are diverse in the manners in which they learn best. Some work best individually, others in groups, some react well to visual stimulus, others to oral/aural stimulus, etc. A strategy which combines types of input has a better chance of reaching more students effectively. Transferring the tool: Any form of technology which can present material using stimulus that goes beyond the traditional written word expands the possibility of effectively reaching more students. A language tool that gives students oral/aural stimulus, an astronomy tool that presents material visually, a newsgroup or communication tool which allows isolated students to work in groups --all of these expand the opportunities for positive and successful impact among a wider variety of students.

3. Web-based assignments can be used at all levels of language-reaming to combine a wide variety of information sources with culture-specific examples of language in use ("real") such as soup can labels, television commercials, newspaper articles, recipes, and comic strips. Theoretical background: Linguists agree that language-reaming is most effective when communicative samples are culturally and contextually significant. The best means of achieving this is by using realia. The Web is a great source of realia. In addition, when affective filters are lowered, students will be more open to allow reaming to occur. Often, the opportunity to explore topics of their own interest on the Internet allows students to lower their affective filters. Transferring the tool: Apart from providing realia, the Web gives students access to an increasingly wider variety of information sources on almost any subject available, and in almost any language imaginable. The incorporation of real examples can be just as effective in business, political science, or journalism, as it is in modern languages. Using the Web to inspire written assignments, projects, and group tasks provides an instructor with a limitless resource for helping to develop critical and creative skills in any field. By allowing students to explore the Intemet, the instructor empowers them to shape their own learning tasks and helps them to escape the often quite limited options of pre-fabricated writing themes or case studies.

4. Videos are often a great way to provide students with a level of input that is slightly higher than their own. Theoretical background: If students are not exposed to input that is structurally a little more complicated than the level they have reached, no reaming will ever occur. This exposure needs to occur within a context which will allow students to surmise what they do not explicitly comprehend. Yet,

interaction with other students at the same level rarely elicits input at a higher level. Transferring the tool: Using videos which raise students to a higher level of linguistic or conceptual input will prepare them to meet increasingly more complex learning tasks.

5. Presentation software allows both students and the instructor to organize important points with clarity and brevity. Theoretical background: Again, learner differences are at play here, and some learners need to visualize in order to absorb material, just as others may have a certain degree of difficulty discerning the key points in a lesson. Transferring: the tool: Presentation software is one of the most universally transferable tools that technology offers us, yet it is ironic that many teachers don't discover its usefulness until they are forced to use it when they're deprived of the blackboard in an ITV class.

6. Incorporating meaningful graphic images into classroom presentations and assignments is useful in helping visual learners to connect with the subject. Theoretical background: For much the same reasons that Web realia is more contextually significant for students and provides a good base for critical and creative expression, the use of real images can provide positive stimulus for students. When these images include the instructor, fellow students, sites in town or on campus, or other familiar elements, they can become more contextually meaningful. Transferring the tool: A good scanner could be used to create a veritable library of images. Photos can be used to give visual examples, to inspire descriptive writing, to spark dialogue, to give a broader view of the subject at hand, or to provoke reactions, among other uses in the classroom.

Business school applications and experience

The use of presentation graphics in economics has greatly enhanced the class, since economics is a course in which faculty often try to present a large amount of information to the student in a short amount of time. The material is very factually based with concrete mathematical relationships. The economics faculty are using PowerPoint and video to aid in student learning with amazing success. PowerPoint is used to provide a visual stimulus which supplements the verbal lectures. These presentations organize the material and provide for consistent delivery . In addition, PowerPoint is used to perform simple animation by overlaying slides using the build feature. The faculty also uses video clips of common television shows and has the students discuss in groups the relationship between the show and the lecture. This application of technology has been deemed by the students to be very effective. Why? The faculty was able to use technology to verbally, visually, and collaboratively stimulate the student. Thus, the material was presented in various forms which appealed to different learning styles. The above is a simple use of technology that is very effective.

In Accounting, Finance, and Production Operations we are faced with trying to teach the time value of money. This is especially true when dealing with inventory or borrowing money. An accounting faculty member used PowerPoint to perform a simple simulation which graphically depicted dollar bills piling up over time. This was effective because it visually articulated a time dependent concept.

The Business Policy class is a good illustration of how technology can be used for ITV beyond the simple delivery of the material. Seven years ago, ENMU began using a computer simulation game in the Business Policy Class. This class is the senior capstone course for all COB majors. Students are placed in groups, and each group is a company. The computer simulation places the companies into a competitive environment, and it engages the students in the learning process. They must make decisions on pricing, borrowing money, building factories, pay rates, number of employees to hire, scheduling employees, advertising, etc. The groups meet for several hours a week to formulate their decisions. The computer simulation game itself is an excellent example of effective use of technology. The program helps students understand the interactive relationships of strategy decisions over time and visualize the economic relationships that exist in the business world.

Additional challenges are imposed when teaching the Business Policy class on ITV. Often you have one or two students at a site. These students have traditionally been given different assignments. We are now exploring using listservs and Microsoft's NetMeeting to facilitate virtual meetings. The decisions and results are then emailed. Our experience indicate that there may be some advantages to this. When students are meeting face to face often one person dominates the discussion and other members are less

likely to provide their input. This way the students are less intimidated and seem to provide additional input.

Simulations in Science

In the teaching of science it is very true that a picture is worth a thousand words. Simulations are useful in many teaching situations. We have specific examples from physics and chemistry. They address the visualization of time dependent phenomena whose time scales are too short or too long to permit demonstration in the laboratory, visualization of concepts or processes beyond the ability of humans to naturally perceive, the strong dependence of the time development of natural systems on the system's initial conditions, and training on instrumentation beyond our budget.

One highly successful example of use of a simulations program is the use of Skyglobe , a shareware program that shows the sky at any time or location in the northern hemisphere from 30000 BC to 30000 AD, in the introductory astronomy course. Skyglobe shows over 3000 stars, the locations of the eight other planets and Messier objects. With Skyglobe it is possible to show such celestial events such as retrograde motion of the planets and planetary conjunctions. A particularly successful application is in showing the resulting change in the location of the North Star due to the 27000 year cycle of precession of the equinoxes. Student response to the use of this software has been overwhelmingly positive. Skyglobe is easily available and easy to use.

Some phenomena are beyond the ability of humans to directly perceive. A set of physics software published by Wiley and developed by the Consortium for Upper Level Physics (CUPs) is used in introductory and upper level physics and astronomy classes to help the student see what is usually unobservable. An example of a particularly useful simulation package from this software set is a demonstration of the difference between linearly and circularly polarized light. The DOS-based software shows how the electric and magnetic field vectors change with time in a window which is fully rotate-able for a view from any perspective.

Nuclear magnetic resonance (NMR) techniques are important to learn for undergraduate and graduate chemistry students. NMR imaging is used in hospitals to do non-intrusive mapping of the human body. However, the equipment for NMR is quite expensive. Software is used at ENMU which simulates the operator console of an NMR machine. The package generates data at the students request as though the student were operating a real machine. The student learns to use the machine, what format of data to expect, and how to interpret the data. SKYGLOBE is shareware available on the network from KlassM Software.

Some simulations packages are quite outstanding and demonstrative, while others are not at all useful, whether it is shareware or expensive software specifically developed for teaching. The advantages of a good simulations package are many. Concepts and phenomena can be demonstrated clearly. In the example above with Skyglobe, epistemological change resulted through its use. Precession of the equinoxes and the resulting change in the night sky is a subject that was previously skipped or glossed over. Now it comes alive for the students. They remember and understand it. In the case with the nuclear magnetic resonance imaging simulations software, students can learn how to operate a piece of equipment and fully understand a measurement technique without having to actually purchase expensive machinery.

However, there are some disadvantages. There is no one "uberprogram" than can be used to simulate every physical phenomenon with meaningful nice-looking graphics. The time spent in locating and reviewing software can be quite great. In addition, there must be some method of displaying the software package graphics to the whole class. Presentation equipment, such as an In-Focus machine, must be used.

It is not always true that simulations software is expensive or hard to find. One faculty member has found an expensive and elegant way to get presentation software (Powerpoint) to be useful in describing the vibrations of a molecule. He alternates back and forth between two or more slides, each of which shows a molecule in a particular position. In changing the slides the molecule seems to move!

ITV

Another challenge faced by faculty at ENMU is that of distance education. ENMU has seven Interactive Television (ITV) remote sites. The College of Business provides students with the opportunity to complete their Bachelors in Business Administration and Masters in Business Administration at the remote sites. Here technology has met several needs. The ITV rooms are equipped with an Elmo overhead projector, computer, televisions, and VCR, all of which, through the use of a control panel, can be transmitted live to the remote sites.

Many of the faculty incorporate PowerPoint into their classes. In an ITV art class, the images from a slide projector come through beautifully on the TV screen. One faculty member uses PowerPoint for his film class and has learned how to put slides from videotape into his presentations. It looks terrific. A highly successful use of ITV is in composition classes. In this class, the computer easily becomes the blackboard. An incorrect sentence could quickly be corrected and seen by every student. Students call in their corrections and the instructor types them in as they spoke. ITV puts every ITV syllabus on the net, helping the students become more technologically literate (probably the faculty too).

As any ITV instructor knows, often part of every class is spent dealing with one problem or another. Time is taken away from instruction. Our biggest technological challenge with ITV is the communications system with sites. Audio feedback loops are persistent, microphones at the broadcast site do not pick up student questions or comments so the instructor must constantly repeat them for the benefit of the sites, and students at sites must phone in with questions or comments, creating a delay between the instructors statement and the students question or comment. Faculty report a variety of consequences for their classes, both positive and negative. One instructor, teaching an introductory research writing course reports that discussion is very difficult if not impossible. She believes, however, that her difficulty has as much to do with the students as the equipment. Students at the 100 level do not wish to speak their comments loudly so that far sites can hear them, nor do they want a camera on them. Discussion is stifled. In addition, some of her off-campus students are advanced high school students on their lunch hour who seem to be treating the class as a recreation time. On the other hand, another faculty leading an upper level combined undergraduate and graduate course found that the students at that level are more focused and willing to put up with the technical difficulties, and do not mind speaking up or being on camera.

Conclusion

The examples and challenges presented are meant to serve as samples of the way in which we can develop tech-tools that can be adapted for use in many disciplines. This is by no means an exhaustive selection of tools, and, indeed, it is only meant to spark the imagination of colleagues in and out of the field. We would have many more strategies to share if we could just look beyond the specifics of our applications of technology to the pedagogical reasons why they work, for it is in these underlying and more general levels of strategy where most disciplines meet.

[TOP]

The Nature of Teaching and Learning in the Multimedia Laboratory Classroom: Process, Activity, Problem-Solving, Engagement

Linda Best, Ph.D.

- Abstract
- Introduction
- Implementation
- An Overview of Classroom Experiences
- Comments
- Closing
- References

Abstract

In Spring 1996, I sought and received funding for a multimedia interactive laboratory classroom that would serve ESL students from their beginning level course work through their advanced studies in composition and research. Reasons for seeking funding were many, the most compelling being the nature of teaching and learning in the College's ESL Program and the literature on computer-assisted learning. An overview of the project, from its conception to implementation, follows. Special emphasis is placed on the facility itself as it has transformed the teaching and learning experiences of those using it. The discussion includes descriptions of special class activities, software, and use of e-mail and the Internet for instruction. Information presented is applicable across content areas and skill levels.

Introduction: Project Design

In Spring 1996, I sought funding from the State, through its Language Minority Student Grant Program, to develop a classroom with state-of-the-art hardware and software which would transform the College's ESL Program into a model for computer-assisted interactive language learning. The philosophy and mission of the Program presented, it seemed, an optimal environment for implementing a project of this nature successfully. The Program stresses active learning, student engagement and responsibility, self-reflection, empowerment, and contextualized learning so that its students will develop the capacity to monitor their work, retain and use what they study, and relate it to their long-term goals. The Program's faculty and staff attend to individual students' learning styles and strategies. Overall, it seemed that practices in the Program
would be compatible with and enhanced by a technological environment which would place students at work stations to emphasize critical thinking, problem-solving, and self-monitoring and to engage them

in active learning; would enable teachers to "tap into" their students' work via a server and appropriate software in order to respond to language in process rather than language products; would offer students and teachers opportunities to write, revise, and read together via appropriate software and a projection screen in order to expose, examine, and strengthen strategies for reading and writing; would foster the decision-making collaborative activity involves without creating biases or imposing penalties.

From the start, project design focused on equipment that would expose the students' language learning processes and skills and enable the teacher to model language forms in use. In light of important literature, technology was perceived as an integral part of a curriculum for fostering language rather than an add-on or supplement in the tradition of the word processing computer lab outside class time, from which students developing their language skills, especially ESL students, derive little benefit. (Ching, 1990) Incorporated into the project's design were certain specific goals for students: to develop English language skills in all areas: reading, writing, listening, and speaking to compete in both the academic environment and the work place; and to measure these skills through the in-house pre- and post- measures the Program currently utilizes; to participate in interactive, computer-assisted language learning activities to gain self-confidence as well as linguistic competence; to receive a full orientation to the laboratory's hardware and software; to use the laboratory's equipment to practice reading, writing, and critical thinking skills; to receive immediate feedback about skills development through both the interactive software and input from others through a server; to improve, as a result of immediate feedback, individual self-monitoring and self-assessment skills; to review and respond to literature about technology; to understand technology as a tool for learning, communicating, and competing in the work place; to overcome, in cases where applicable, any pre-existing, negative views about technology; to become familiar and comfortable with the laboratory in order to recognize its significance to their success in both the ESL Program and the content areas; to participate in collaborative learning exercises to understand the challenges and benefits of team work; to discover individual learning strategies and skills for improved academic performance both within and outside the ESL class.

With notification of funding in Summer 1996, the Program's faculty and staff began the process of creating the laboratory classroom and meeting the goal of integrating technology into instruction.

Implementation: Facility Design and the Classroom Experience

The Facility

At the moment, the laboratory classroom is in a temporary location, which is actually too small for the furniture and equipment the ideal lab would have. With the announcement of the grant award, the lab was established in a room already wired for equipment. Plans are underway to renovate a larger room for the lab prior to the start of the 1997-1998 academic year. When the lab is re-located, it will be fully furnished.

In its current state, the lab is furnished with 20 work stations for students. These stations house CD ROM PC's which are nested inside the work stations under a view-thru glass. Keyboards rest on pull-out trays. The computers' central processing units are specially-designed to stand on their sides, length-wise, in cabinets on the side of the work stations. Unlike labs with desk-top computers, this facility frees the work surface so that teachers and students do not feel compelled to use computers for an entire class period or have equipment interfere with normal classroom activity, such as discussion or work in pairs. Most important, the recessed equipment makes the students visible to the teacher. They are not hidden behind PC monitors. Furthermore, the furniture facilitates interaction among students, it gives them the choice to use paper and pen for class activities when desired, and it places them in the natural position for composing--with their heads bent downward rather than tilted upward.

Right now due to limitations in space, the students' work stations are arranged in 2 islands of 10 units, with 5 work stations in one island facing another 5 stations. Face to face and sitting side by side,

students interact a great deal more than they do in the traditional lecture-style classroom. This is particularly noticeable to those teachers and students whose classes meet in the lab one day a week and in a lecture-style room for a second weekly meeting.

A new lay-out for the lab will be developed with its re-location for Fall 1997; a proposed design will be to have 5 groups of 4 work stations in which 2 work stations face another 2 work stations.

Other changes for Fall 1997 include the installation of a white board, the set-up of a desk-top projector, the addition of a locking case for manuals and reference materials, and the addition of the teacher's station, a full-sized work station with a view-thru glass. Funds for these are currently available; space is not.

An additional computer in the room now serves as a virus scanner and as the teacher's work area. It rests on a traditional-style desk. Students disinfect their disks in this unit before inserting them into the computers at their work stations. Teachers utilize this additional computer to interact with and monitor individual students in electronic conference-like activity through various classroom management applications. All computers in the room are linked to a hub, which connects the lab's equipment to the room's laser printer and a server. The facility's server is located off-site in a technical assistant's office area. This server links the classroom to the College's network, making the use of e-mail possible and establishing access to the Internet via Netscape. Over time with additional software applications, the server will transform the classroom further into a complex self-contained as well as global communications network.

What makes this lab unique is the way in which technology assumes a central role. The equipment is visible and accessible at all times. It leaves users with the impression that technology is an important part of the classroom experience. It is part of each course's content; it is also a medium through which students access other material relevant to the course and practice reading, writing, listening, and speaking skills.

This laboratory classroom is open six days a week: Monday through Thursday, 8:00am through 10:30pm; Friday, 8:00am through 3:00pm; and Saturday, 10:00am through 4:00pm. Instruction takes place in the lab the majority of the time. When classes do not meet in the lab, open hours are held. Currently, the lab is open to walk-in traffic 171/2 hours per week. During these hours, scheduled events as well as drop-in practice for both students and teachers take place. Scheduled events include keyboarding classes for students who lack typing skills, tutorials, training for lab assistants, and faculty workshops. A technical advisor and I train the lab assistants. Topics covered include responsibilities, certain technical skills, engaging/disengaging the alarm, security issues, and review of software applications for classroom practices.

In the classroom, lab assistants share their knowledge with teachers; they work together to develop a technological component for instruction.

Faculty workshops fall into two categories--large orientation sessions, where information about procedures, software, and classroom practices is shared and opportunities for hands-on practice exist. Smaller practice sessions target specific areas that will help faculty improve their skills and/or develop course materials. Small practice sessions review e-mail and/or the Internet at the introductory, intermediate, and advanced levels; they focus on specialized topics like how to prepare a pie graph; they review software for specific skills and levels; and they offer hands-on practice.

Walk-in traffic during open hours has kept the lab at an 80% occupancy rate when classes are not in session. Faculty stop by for practice or to prepare lessons. Students stop by to work on papers or assignments, to check their e-mail, or to browse the Internet.

An Overview of Classroom Experiences

On a day-to-day basis, the ESL students at Kean College engage in a number of activities grounded in technology. With the passing of time, we have begun to see patterns of activity for particular skill areas and levels. At the same time, we see variation in what occurs in our different courses. Students' as well as teachers' orientations to technology and individual instructors' perspectives on how technology relates to instruction explain the differences we see. We do not regard these as detrimental to learning since we have only begun to implement this project and since we recognize that individual differences across teachers and students will always impact the nature of instruction.

Regardless of the course and level, however, students who have class in the lab are enthusiastic about the opportunity to use technology for learning activity. It is clear that using technology is a new experience for many students at the high-beginner level. While some are facile with the equipment, the majority need an orientation to a range of procedures and practices, from formatting a disk to saving on a disk to creating files and inputting as well as revising text. At this level, students use the equipment for dictation exercises, to free-write or brainstorm, and to compose essays. These students will receive an introduction to e-mail and often enjoy their first access to the Internet. Their faculty have the opportunity to review and try appropriate writing/grammar software.

Technology is a more integral component in the intermediate and advanced courses. Even though some students at this level are developingtheir technical skills, technology plays its role in instruction in a number ofways. It must be noted that those students who lack computer skills are not left behind at any time. Capable lab assistants staff the facility, offering individualized support for users.

Technology emerges as an essential element at the intermediate and advanced levels, for writing is the focus of all course work. Communication is stressed. Students and teachers use e-mail for distributing syllabi, for submitting and responding to assignments, for offering a preview of the next class meeting, to obtain information about class protocols, such as group assignments for an upcoming peer session, tutorial assignments, or work covered during an absence from class. E-mail also supports global interaction.

Additionally, students access the Internet to participate in chat rooms or to obtain supplemental reading material, and they utilize software for practice with writing. They enjoy the benefits of software that enables teachers to comment on their students' work electronically. From the comment function on Word Perfect to applications like CommonSpace, which divides documents into columns to allow for writing and responding activity from self and others, to applications like Dadaelus, which creates a mail exchange among members of one class, provides prompts for brainstorming, and includes a function for formatting documentation in research papers, teachers have found that technology offers students hands-on, individualized practice at a rate they can handle as well as enjoy. Complementing the software purchased is the vast number of language skills practice exercises that can be downloaded from the Internet.

Teachers also author their own course work. At the moment, our efforts in this area are quite primitive; we prepare disks for installation on the server and have students access them during class time. We are also reviewing ToolBook 2, which is licensed to the College and realizing its potential, as well that of the authoring formats available on the Web.

Nowadays, students are likely to submit work on disk or save it in a common class directory. Course work in composing involves writing, revising, editing, and peer collaboration, all of which are supported effectively in this technological environment. More oriented to computers, students at these levels not only produce their texts; they also work on their presentation and develop elaborate cover pages as well as appropriate visuals.

The laboratory classroom plays a unique role in one specific course in the Program: the research course. Equivalent to a general education requirement, this course enables students to develop requisite investigative skills while continuing to hone their language skills. The lab plays an important role in this course. First, students at this level most likely have experience with computers. Second, the emphasis on

research makes access to the Internet relevant. In the most technologically-advance course sections, students practice importing information from the Internet and paraphrasing, summarizing, and directly quoting it. Students begin to understand how to forward mail and include attachments, recognizing why someone may have the need to perform these actions. They get hands-on practice with the process of integrating texts and documenting sources. Supporting this work is the writing software with documentation functions, which has already been mentioned. Third, since course requirements have students investigating topics and reporting findings, students discover the importance of charts, tables, and graphs. They develop these products in the research class, enhancing their technical skills and, more importantly, coming to a fuller understanding about how to interpret information plotted on visuals.

Across levels, there are common experiences as well as subtle distinctions in the use of technology. Generally, teachers find that students engage in and respond to learning activity in this technological environment, that they interact more readily with others, and that they enjoy opportunities--especially through software and with help from lab assistants--to work at their own pace and level. Additionally, the students in the Program have found that opportunities to enhance their technical skills exist outside class time.

Comments about Teaching and Learning

Activity and Engagement

Few discussions about educational practice take place without mention of John Dewey. To many readers, his insights on education leave quite an impression. In his time, Dewey argued against developments in mass education, observing students' detachment and expressing his belief that they were passive in the classroom--empty vessels waiting to be filled. Dewey described ideal learning situations where materials were authentic, instruction was student-centered, lessons involved doing, and teachers served as mentors or facilitators. (1916) Today, we continue to move towards process instruction, which parallels Dewey's insights. Certainly, in the experience of creating, implementing, and teaching in the laboratory classroom, I have seen how technology is a critical tool for achieving the ideals Dewey envisioned. No matter how little or how much exposure students have to technology, a curiosity as well as certain positive assumptions about it exist. To use any part of it requires action, and it has seemed that when students act--when they take that step to use the equipment available to them--they connect with the classroom experience. Students are stimulated further when they realize that learning through technology offers more options than the traditional classroom experience can.

The Roles of Teachers and Students

Assuming an active role in the classroom, students are more visible, and oftentimes, they are more vocal as well. In Kean's lab, where the physical lay-out places students in work teams for learning, there is a great deal of interaction. With learning activity taking place due to the students' active role in the class, teachers find their role undergoing a transformation. In the environment described in these pages, teachers no longer find themselves performing the "one-woman/man show" for an entire class period. Rather, in addition to providing certain lessons and presentations, teachers find themselves circulating among students, checking certain assigned tasks. Also, the teachers find that they are responding to writing as it is being produced. They guide the process rather than grade a paper after it is written and leave their students with overwhelming and unmanageable revision tasks. Additionally, these teachers oversee group projects and sit with different teams to hear their progress reports. Teams eventually report on their work, taking some responsibility for class instruction into their own hands. Instructors find that they are able to conduct conferences during class at times, record notes about individual students' progress, orient groups to the next phase of learning activity, and shape curriculum for the next day, week, or month.

In classrooms where learning activity rather than the transmission of information takes place, teachers experience a new role as facilitator and mentor. In this capacity, they are able to monitor individual students, which, in turn, makes students themselves assume more responsibility with regard to the

course, its expectations, and its requirements. People who have experienced this new role in the classroom have found it both refreshing and rewarding.

The Nature of Knowledge

With a focus on activity and with both teachers and students involved in learning processes, the laboratory classroom has broadened the scope of knowledge in the domain. While the traditional class shaped the knowledge to be studied, making it feel fixed and rigid, the laboratory classroom is open to the pursuit of knowledge. In this context, knowledge appears dynamic and can be perceived as authentic as well. Certainly, fundamental principles about language guide instruction. However, the many options for learning make it possible for individual students to access new information relevant to the topic under review. Discovery occurs in the laboratory classroom. It introduces a critical thinking component; students find themselves reporting the information they access, evaluating its significance, connecting it to other information, and integrating it into their conceptual framework for the course.

A Few Words about Assessment

Teaching in the laboratory classroom introduces unique questions about assessment. When instructors participating in the project were asked to describe their students' progress, they spoke in qualitative terms. Consistently, instructors' evaluations stress how technology has enabled their students to produce more language, to concentrate on global rather than local problems, to revise frequently, to take risks, and to incorporate sweeping changes into their final drafts. Additionally, instructors indicate that due to their opportunities to practice writing on certain applications, students' abilities to develop ideas, to know their personal strategies and skills, and to monitor their work showed significant improvement.

The data the faculty participating in the project offer are not the standard pre- and post- test score statistics. Rather, they are comments which capture the quality of what their students tend to do. Their evaluations, which focused on learning processes rather than course products, suggest that instructional technology can play a significant role in our efforts to reform assessment in education.

Closing

The ESL Laboratory Classroom has kept the faculty busy this year. It has opened instruction to a vast range of techniques and an ever changing content base available through the Internet. Everyone involved has come to understand the magnitude of the project and the time it will take to integrate technology fully into the Program's curriculum. The faculty remain enthusiastic and adventuresome, realizing this facility can be enhanced further. Along with current efforts to create the laboratory classroom proposed for the grant award, I will continue to seek funding to support enhancements we are enable to envision today. Specifically, we see the need to support our teachers' ability to participate in the project. Teachers' authoring stations, which consist of notebook computers, would give all teachers fair opportunities to develop course materials regardless of the type of equipment they have at home. Additionally, the current facility, whose ultimate purpose is to integrate all language skills, is heavily oriented to reading and writing. There is the need to explore its potential for oral skills practice, to obtain microphones and headsets, and to examine as well as select software for this aim. Since the lab's critical component is its interactive nature, we also seek sophisticated software to extend collaboration in the classroom beyond the composing process. Certain GROUPWARE applications are under review for this purpose. Together, these enhancements will transform the laboratory classroom into an extraordinary facility for teaching and learning.

References

Ching, R. and others. (1990, March). Making connections: computers,

tutors, and ESL students. Paper presented at the Annual Meeting of Teachers of English to Speakers of Other Languages. San Francisco, CA.
Dewey, J. (1916). Democracy and education. NY: Macmillan.
Freire, P. (1970). Pedagogy of the oppressed. NY: Seabury.
Pennington, M. (Ed.). (1996). The power of CALL. Houston: Athelstan.

[TOP]

Enhancing Student Learning Through Electronic Communication Technologies

Janet Buzzard, Ed.D.

Laura MacLeod, Ed.D.

Calvin W. DeWitt, Ph.D.

- Web Pages
- Electronic Mail
- Listserves
- Webphones
- Newsgroups
- Newsgroups Assignments for Business Classes
- Other
- Summary

Communication is a key component in education. The ability of a teacher to effectively convey a concept to the student and for the student to be able to understand and synthesis what the teacher is presenting is of paramount importance. Often this communication is hindered because the teacher's style of delivery does not fit the learning mode of the student or the time frame in which the delivery is provided is not a productive time for the student. Educators are also aware that many students learn better through collaborative exercises with other students. The key ingredient is effective non-time non-space bound communication. Eastern New Mexico University's College of Business is using technology in various ways to help facilitate better synchronous and asynchronous communication between faculty members and students and communication among students. Several applications of this technology is discussed below.

Web Pages

The World Wide Web (WWW) is one of the most widely used parts of the Internet. The World Wide Web encompasses a global network of computer servers which provide information to users through a user friendly browser. The World Wide Web is one of the major reasons for the explosion of the Internet. This information can be provided in a variety of formats including text, graphics, sound clips, and video. The information is posted on Web pages. The pages are created using programming languages such as HTML, JAVA, and CGI scripts. Several excellent Web page generators, such as Microsoft's Frontpage, are also available. The user accesses the information through a client machine using a browser such as Microsoft's Internet Explorer or Netscape's Netscape 3.0.

The WWW is an interactive medium. Users click on hyperlink icons which then retrieves other pages or objects which may or may not be on this server. Thus, the medium is different than that of paper in that the user dictates the order of delivery of the information.

We have exploited these features of the WWW in our classes. We have posted our class notes, syllabus. practice tests, ancillary materials, and presentations on the WWW. Students perceived this to be extremely effective. The material is available to them in any setting at any time arranged in the order that they desire. Thus the student no longer is restricted to learning at a specific time in a specific room but rather learn when the time is best for them.

Faculty also provide links on their pages to other sites. Effectively multiplying the resources to which the students are exposed.

Electronic Mail

Electronic mail is becoming more widely used across campuses nation wide and probably world wide. It's hard to experience the Web without quickly realizing the need for electronic mail or 'an e-mail address'. Students are entering college with experience in electronic mail. The ability to avoid printers, U.S. Postal service, and/or campus mail in addition to the costs associated with each is attractive to e-mail users. Many students interact socially in cyberspace through IRC (interactive real-time chat) and electronic mail. IRC allows the users to communicate through the keyboard at the same time or 'realtime'. Students can meet and communicate with other people from all over the world. The setup requires connection to the Internet and IRC software.

Listserves

Listserves are also used extensively across campus. They offer a group of people such as a class the ability to communicate through e-mail. The professor sets up and designates a name for the listserve such as 'CIS29301'. Then each participating member must subscribe to the designated listserve by sending the computer administrator an e-mail message stating their intent to subscribe. The subscription is confirmed by a return e-mail giving the e-mail address of the listserve and the student is subscribed. Now anyone can send an e-mail to this listserve address and every subscriber will receive the same e-mail message. This have proven to be an effective way for the professor to broadcast related course information to the class. Questions can be sent to the listserve for students to respond to. Class size can be a factor in how one might utilize a listserve, since each member receives every e-mail sent. For example, if 60 students are subscribed to the listserve and everyone is required to respond to a question once, each student will get 59 e-mail messages.

Students use the listserve for completing homework. If they are needing assistance after hours they can send an e-mail to the listserve stating the problem(s) they are having with the homework and ask for help from other students. Once students participate in several listserves they start to use them more. Our students will frequently come across related information to the course and send it to the listserve. Our faculty has realized the effectiveness of listserves and the students seem to appreciate the extra communication exchange.

Web Phones

Web phones such as Microsoft's Netmeeting (the second beta release of Netmeeting 2.0 is now available for free download at http://www.microsoft.com/netmeeting) and Netscape's Cooltalk (available at http://www.netscape.com) offer the ability to communicate with or without audio in real-time using your Internet connection.

Netmeeting conferencing software version 2.0 is the latest release of the standards-based, real-time multimedia communications client for the Internet. Netmeeting 1.0 was the first real-time communication and collaboration client for the Internet to support Internet telephony functionality and to feature standards-based multipoint data-conferencing capabilities based on the International Telecommunications Union (ITU) T. 120 standard. Netmeeting 2.0 adds support for standards-based audio and video conferencing based on the ITU H.323 standard, making it the first real-time Internet communications client that supports standardsbased audio, video, and data capabilities. Support for the H.323 standard enables users of NetMeeting to call, connect, and communicate with users of other H. 323compatible products and services. The setup requires both sender and receiver to be connected to the Web and the Web phone software to be installed on both ends. Audio with sound card, speaker, and microphone is optional.

Currently most connections only allow one-way transmission and depending on the speed of the computer system and modem the lag time tends to detract from the flow of the conversation. But the

options for communication between faculty and students and instructional purposes are numerous. By sharing an application running on their co.mputer, many people can participate in a conference to work together on documents or other group efforts such as collaborating on research, exchanging graphics and diagrams with an electronic whiteboard, transferring files, or communicating using text-based chat.

Several professors are using NetMeeting in their Instructional Television (ITV) courses . One example would be disseminating a file (any windows application file) to be used during class. Before class, the professor establishes a conference by calling the facilitator on the web phone at the site and uses the 'File Transfer' feature to send the file(s). When students arrive they get on their computers and ask to join the conference. So eventually the whole class is one single conference. Since NetMeeting is also groupware software, everyone can add their comments inTealtime to the file for on-line collaborative learning. Any one of the participants in the conference can choose to take control of everyone's screen to demonstrate an idea or a concept. This feature is called 'Collaborate' from the 'Tools' menu. They might use the 'Whiteboard' feature, which is similar to Windows' Paintbrush application, to draw or type ideas. Any windows application you have available (Excel, PowerPoint, Calculator, etc.) can be viewed by everyone in the conference. This feature is called 'Share Application' from the 'Tools' menu.

Also, the faculty can have 'virtual office hours' for students off campus. Just as regular office hours are designated virtual office hours could also be set up. During the virtual office hours, the faculty member would be available on-line for real-time interaction with the students using the previously mentioned features. We are just starting to explore the many uses of Web phones and workgroup software as an instructional tool. As technology continues to improve in the transmission and video areas, Web phone and workgroup software will become an even more widely used instructional and communication tool.

Newsgroups

A newsgroup is a public bulletin board where users with Internet access can read, reply to, and post messages for everyone to see. More than 15,000 newsgroups are available covering any topic you can imagine.

To participate in one of these newsgroups you will need a newsgroup reader. The reader allows you to follow threads (messages and their replies), automatically download messages, stitch together multipart file attachments, and more.

Most Web browsers have a built-in newsgroup reader, but these readers can't match the capabilities of a standalone reader. A good newsreader has strong organizational tools, intelligent attachment handling, and strong filters that separate the useful articles from the useless ones. One of the better standalone newsreaders is Free Agent, based on reviews of the best newsreaders provided by C/Net. These reviews can be found at the following URL:
http://www.cnet.com/Content/Reviews/Compare/Readers/index.html.

Before your newsreader will work, you must enter information in the Options Menu under the Mail and News Preferences. It will need to know the names of your incoming an~ outgoing mail servers and your news server. You will also have to enter your email address and user name. If using newsgroups for a class assignment in a lab environment, you should stress the importance of updating the information in the Options Menu every time the students use a newsgroup. They should also delete their information in the Options Menu after their final posting if there are multi-users of the computer. This assures that the next person on the computer does not use your identity information to post a message.

To read more information about newsgroups, access the Internet presentation "Everything You Need to Know about Viewing Newsgroup Articles and Pictures" at the following URL:
http://www.hobsonsquare.com/ngmenu.htm. The following topics are discussed within this Internet presentation:

1. Introduction to Newsgroups http://www.hobsonsquare.com/ngintro.htm

2. Basic Setup Steps Gaining Access to a News Feed: http://www.hobsonsquare.com/nga.htm.

3. Understanding the Elements of a Newsgroup Header: http ://www.hobsonsquare.com/ngb.htm.

4. Acronymns, Terms, Smiley Guide: http ://www.hobsonsquare. com/ngk.htm .

5. Browsers, Decoders, Viewers, News Readers, Utility Software:
http://www.hobsonsquare.com/ngm.htm.

Once you have learned some of the basic information about newsgroups, you may want to try the search engine DejaNews to search for newsgroups and postings that interest you. More than 800 megabytes, equivalent to over 300,000 pages of text, is posted to newsgroups every day, so you can imagine how difficult it could be finding the information you want. DejaNews maintains an archive of over 53 million articles dating back to June 1995. You can search these articles using specific keywords, or you can create a query filter to search for certain newsgroups, dates, authors, and subjects.

Newsgroups Assignments for Business Classes

Business instructors can use newsgroups for various purposes. They can serve as a platform for students to share information and express their opinions. Instructors may use them to review for a test or to answer a question about any topic. The following sections will explain each of these uses in more detail.

Sharing Information

Students may be having difficulty finding secondary sources for a report assignment. In the past we have had each student post an abstract to the class news group for one or two of their best secondary sources. They include a reference entry for the source and a two- to threeparagraph summary of its contents. Then, if the source is an Internet page, they provide a link so that readers can access the secondary source right from the news group posting.

Students often have problems with a long-term assignment, and the news group can serve as a platform for presenting and discussing these problems. For example, if a student is experiencing difficulty writing a conclusion criterion for an analytical report, the student could 6 place his/her version in a newsgroup posting asking for help, and classmates could reply suggesting how the criterion needs reworded or quantified.

The newsgroup can be an effective forum for students to express their opinions. Our business communication students are in a computer lab for one class a week. Much time can be w asted as we wait for all students to arrive so that class can formally begin, or after students have finished a writing assignment at various times at the end of class. To make good use of this down time, you can have students post an message to the newsgroup answering a question that allows them to share their opinions. For example, the instructor could ask for the students' opinions on how the writing assignments could be made more interesting to them, or what gave them the most trouble with the writing assignment they just finished. Students tend to be more open and honest in expressing their opinions in a newsgroup versus face to face, even though in the long run a much larger audience exists.

Reviewing for a Test

A very popular newsgroup application is a test review. We place test questions as a series of postings on the newsgroup. Each question is set up as a separate posting. If you place all questions in one article, students tend to just print the posting and not participate in the review. Students are then assigned one question that they must answer. They reply to the original posting with their answer.

We include short objective questions such as true or false and multiple choice questions in the review. However, along with their short answer, the students must write a paragraph justifying their answer including definitions, what part of a false statement was incorrect, or what was wrong with the statements not chosen in a multiple choice question. Of course, students can read other students' postings and reply indicating if they think the question is incorrect and how they would change the answer. If the

activity is effective, a series of replies will appear for many of the questions. A few days before the test, the instructor may want to post a final reply for each question indicating the correct response.

Answering Questions

Newsgroups serve as a source for answering just about any question that comes up. For example, our business education students were curious about the difficulty of the national teacher's exam. Through the search engine DejaNews, we found several postings in the k12.chat.teacher newsgroup in which teachers give advice for studying for the test. These are just a few of the classroom applications that can be carried out effectively through a newsgroup.

Other

In addition to the technology related classroom application discussed above, all computer labs on campus are connected to a network drive, designated as read-only, for the professors to place assignments and a write-once and no read rights drive for the students to save their homework assignments. Each professor has their own password and folder with directories for each class taught. This allows the professor to hand out and collect assignments via the network. Access from home to these network drives is not currently available due to security concerns. However, some faculty members are experimenting with remoting software such as PC Anywhere connected to modems to access their office computers from home. This type of remoting software allows you work on your of fice computer as if you were sitting at your of fice computer with all the same rights and drive access that is normally available to you. Because as file sizes continue to grow, the ability to take student assignments home to grade becomes increasingly more difficult.

Summary

We believe that technology has greatly enhanced our teaching by improving the communication between the faculty and the student and between students. Students have begun to expect the use of technology in their classes to the point that they inquire as to what is the address for the class WEB pages and what is the name of the class newsgroups. At ENMU we have seen a very positive reaction to technology by both the students and faculty.

[TOP]

Reminders:

- Handle documents with care
  - handle with care....these will be microfiched
  - keep pages in number order
  - return documents in IR # order
  - don't loose documents
  - don't loose pages

- Evaluate documents carefully for problem areas
  - Include in <NOTE> any necessary information like
  - Charts contain small type
  - Some figures contain illegible type
  - Very dark figures will not reproduce well
  - Missing figure 2
  - Any other details that you notice that's should be brought to my attention

- Keep samples as guides for future use

- Make sure the document resume is complete...
  - Does it need a <GOV> field
  - Use <AUD> only if author indicates specifically
  - Use title from title page...note different from book cover/spine
  - If the paper is a Masters Research Paper use <PUBTYPE> 040 this is not the same as a Masters Theses <PUBTYPE>042

- The two most important items for ***RIEs and CIJEs*** are the
  - <AUTHOR> and <TITLE> be extra careful in making sure these are correct as they appear on the title page (check the reproduction release for RIEs and the table of contents for CIJEs for discrepancies).

- ***Journals***
  - Make note in document resume to indicate to me that there are problems with title/author differences from the title page to the table of contents
  - Watch what page the article actually starts on vs. the number in the table of contents
  - Watch for publisher errors in vol., issue #, date, etc. (check covers, spine, table of contents, etc.)

- Identifier purged: "Examples" is not to be used as it is NOT a valid identifier

A Post-Gutenberg Student Research Project

Suzanne J. Smith

- Abstract
- Search Engine Failure: When Less is More
- Link Rot
- Analysis and Write-Up
- Lessons Learned
- References

Abstract

Students researched topics in Management and Organizational Behavior using the World Wide Web. They identified five sites representing their topic and categorized them as being either an example of a management theory/research or as being an application of management practice. Each topic included sites of both types. The students then summarized and evaluated the content of each site and wrote up an analysis of the web as a research tool. The students and the instructor found that while the web has great power as a research tool, harnessing that power requires a strategic understanding of search engine services and availability of site maps within each discipline.

How do undergraduate students learn how to do research on the Internet? In Management and Organizational Behavior class, an assignment given during the fall semester of 1996 attempted to break the paradigm of traditional research papers by requiring students to analyze web sites relevant to a management topic.

As the World Wide Web continues to add journals, company background information, and sites dedicated to contributors to the management field, the project's goal was to require students to become familiar with doing research on the web. Students found five different web sites . . representing a topic in one of two ways:

1. A principle or fact-based site that defined terms or gave background information about a management topic

2. A practical application of the principle in an organization's site or journal article about organizational practice.

After surfing for topics, students narrowed the search down to one topic. They then proceeded to use search engines, business directories, and other links to identify five sites representing their topic. While this sounds like barely an afternoon's work, several students spent as much as 20 -30 hours just surfing. And, as anyone who surfs knows well, time warps on the web.

Search Engine Failure: When Less Is More

Perhaps the most frustrating element of the exercise was narrowing down the topic using search engines. Although the instructor and the recommended text illustrated several ways of specifying and narrowing searches, there were many cases where search engines just couldn't filter out worthless sites. Students

found hits numbering in the tens or hundreds of thousands. Ranking by relevance helped in some cases, but in others, the search service just couldn't understand what students meant by relevant.

Search services using literal string quotation marks such as "delight the customer" (Alta Vista, Infoseek) usually narrowed searches better than those that searched for every word in a string (Lycos, Magellan, Excite). A one-word topic such as "ethics" needed more specification. Table 1 reflects the wide range in number of hits based on the key word search system. Each search engine or directory has its own system of searching. Learning the system that works best for each study can be valuable. Each search system also has its own way of formatting its hits, and some provide valuable information such as the date the page was last updated.

Just because the search found a large number of hits didn't mean the hits were at all relevant to the topic at hand or even ranked according to the relevancy of the searcher. For example, the first hit under "delight the customer" in Magellan is in German. Another is for a painting in a museum with the word "delight" in it. Very few hits seemed relevant to the concept of delighting the customer in Total Quality Management.

Table 1. A comparison of hits using six search services.

-

Search Engine	*"delight the customer"*	*ethics*
Yahoo	63	245
Magellan	5178	13,554
Infoseek	111	115,623
Alta Vista	63	200,000
Lycos	32,579	20,027
Excite	4,314	166,033

Link Rot

A second disturbing finding was that terrific links available today might be gone tomorrow. Some of the more responsible students, unfortunately, were not rewarded for starting their projects early. After they had identified several good sites, weeks elapsed before they actually evaluated and wrote up the site. By then, one discouraged student reported that three of her best sites became unavailable. Back to the drawing board.

Analysis and Write-Up

Each student chose five sites representing management principles and practice, and the one to two page report of each site included

- the site's URL
- a small (3 x 3 inch) screen capture picture of the site in the corner of the page (in Windows 3.1 or Windows 95, simply press the Print Screen key on the keyboard and then click paste in the word processor)
- a summary of the site content and its relevance to the topic
- an evaluation of the trustworthiness of the source, the recency of its post, and the depth of the site
- a rating of the graphics, interactivity, and ease of use

The final element of the project included a write-up of the entire procedure. Students addressed the questions

- What did you learn about doing research on the web?
- How did you refine your search?

- How would you evaluate the web as a tool for researching business concepts?
- How would you describe your experience using the web?

For most students, this project was their first assignment done totally on the web. For some, it was their first experience on the Internet. Some suggested that search engines could be improved or refined to exclude sites such as another class's syllabus or lecture notes. Many had trouble finding examples of management practices on the web. While most organizations might want their potential customers to know all about their contributions to ethics and social responsibility, many don't post human resources management policies on the Internet. Internal policies are normally posted on an intranet accessible only from within the organization's firewall.

Lessons Learned

Alrhough nearly all underestimated the amount of time the project would take, students appreciated the opportunity to learn more about searching on the web. In the process of searching for management topics, they learned that organizations really do use the concepts presented in class.

The project held lessons for the instructor as well. In the future, such projects should require students to spend less time searching and more time learning about and linking to web resources that can lead more quickly to the right places. Students and faculty must understand the capabilities and limitations of searching via search engines. Identifying pages with links to relevant sources in an academic field is a good alternative. Business Researcher's Interest (www.brint.com) is an example of a searchable knowledge map that keeps track of sites relevant to information systems managers. AT&T has a Business Network Bookmark (www.boet.att.com) with links to management resources.

In 1995 and 1996, the number of web sites doubled roughly every six months. While that growth rate will not continue forever, it is clear that the number of web sites is growing faster than most of us can keep up. By identifying key resources that track growth within our own disciplines, we can reduce the struggle to sort through thousands of hits in a search engine.

References

Finch, Byron. *The Management Guide to Internet Resource*, 1997 edition. McGraw Hill Companies, Inc. 1 997.

Martin,Justin. "Web Watch," Fortune, November 11,1996.

[TOP]

Incorporating JavaScript and Java Applets in a World Wide Web-Based Multimedia Development Course Dr. Roger Von Holzen

- Abstract
- Body

Abstract The World Wide Web has emerged as a growing force in the areas of computer usage and multimedia development. To reflect these changes, the Multimedia Development course at Northwest Missouri State University has been retooled to merge the new presentation and multimedia elements found on the World Wide Web. The major new components in this course are the teaching of Netscape's JavaScript and the modification and inclusion of Java applets in Web pages. The focus of this paper is on the various multimedia software components of the course and how these components are introduced and integrated into the curriculum.

[TOP]

The Lecture Really IS Dead: Using Electronic Media to Teach On-Campus Courses

Robert D. Larison, Ph.D.

- Abstract
- Introduction
- The Technology
- The Course Design
- The Students
- Student Reaction to the Course
- Instructor Reaction to the Course
- Conclusions
- Bibliography

Abstract

During academic year 1996-97, BA 321-- Principles of Management is being taught to an on campus group of juniors using multiple technologies. The internet is used as a source for print materials, resources and research sites, and as a primary information dissemination medium. Electronic mail and listservs are utilized to establish, develop, and maintain asynchronous conferences and conferencing discussion of course materials during the quarter. The course is designed to utilize the strengths of a number of media while avoiding their accompanying weaknesses. This paper will involve a description of the academic design of the course, a review of the capabilities of each media, and the actual experiences of teaching the course.

Introduction

The advent of new telecommunications technologies has created interesting opportunities for higher education instructors to rethink the fundamentals of their craft. The traditional forms of information and class delivery, the lecture and structured class discussion, have been tied to the classroom. Students and instructors gathered together to share meaningful experiences, debate, and information transfer. With the development of asynchronous computer conferencing, electronic mail, and the internet, it has become possible to recreate many of the activities of the traditional classroom without requiring the gathering of those involved to a specific place and time.

At Eastern Oregon State College, an emphasis has been placed on the development of appropriate instructional technology that will be cost effective and efficient in terms of instructor time. Our student body has been increasing and, with the rest of the State System of Higher Education, our budgets have been declining. The need for developing models of instruction that might be used for campus and/or off-campus distance delivery has been emphasized. The faculty of the college have utilized a number of media over the past seven years to deliver courses including interactive television, asynchronous computer conferencing, and more recently, the internet. Our efforts have been focused, up to this time, on distance delivery of coursework through technology. This paper deals with an effort to deliver an on-campus course through technology alone.

The Technology

Eastern's experiences with technology have indicated that particular technologies have strengths and weaknesses when applied to instruction of college students. Asynchronous computer conferencing has been found to be especially effective. Our experience parallels much of the literature. A brief review will provide a sense of the potential of the medium.

Computer conferencing provides meeting locations that have no physical or temporal boundaries; it is a 'virtual space' (Bissel, Coombs, Medredeff, & Rogers, 1987). It allows script communication that takes place over a set period of time instead of the immediate form that is customary in a live classroom. This type of interaction is termed 'asynchronous' to reflect its intermittent nature. Since all interaction is by text and is facilitated through a computer, the entire text of the conversation or class can be saved for future evaluation. It is possible to have a 'transcript' of a course upon its completion that records all communication that occurred in the course (Bissel et al., 1987).

Computer conferencing offers several advantages over traditional educational practice. Perhaps the most important is that it provides a medium for asynchronous communication between the students and instructor that is readily available at any time, facilitating more interaction among all class members--students, instructors, or any other individuals involved in class activities (Bissel et al, 1987; Harasim, 1987; Mason, 1987).

Class members can participate in group projects, collaboration, peer learning, extensive class discussion, and other forms of peer interaction (Harasim, 1987; Mason, 1987). Mason (1987) says that computer conferencing encourages greater independence and self-reliance in learners, demands expression and critical evaluation of learners' opinions by all class members, and facilitates the idea that education is more than the passing of information from teacher to student. Mason also reports that a study conducted at the University of the District of Columbia found that both students and instructors preferred they type of group learning fostered by computer conferencing over conventional instructional methods in terms of effectiveness, skill development, and enjoyment. Davie (1987) found that graduate students perceived that the intensity and quality of on-line interaction were superior to the interaction of the traditional classroom and that student performance in the computer-conferencing class was higher than in the traditional classroom. Through frequent communication and interaction students develop a cooperative atmosphere characterized by democratic principles and mutual support (Harasim, 1987).

Computer conferencing provides a classroom that is open 24 hours a day, 7 days a week. Students can work around their schedules and have more control over their interaction in the course (Davie, 1987; Harasim, 1987). This individuality is enhanced by the ability of the system to adapt to personalized instruction and tutoring.

Computer conferencing also provides a number of advantages for the instructor. Electronic mail provides an alternative to conventional office hours. A student can 'speak' to the instructor at any time and will receive a response. Courses may be designed in which students submit all assignments by electronic mail and, conversely, instructors disseminate all assignments by the same medium, eliminating the need for making, collating, and distributing copies of materials for students. These powerful components of the computer conferencing classroom depend on the efficient and skilled use of the technology by the instructor and the student.

Most of the literature on computer conferencing deals with course delivery at a distance and a comparison with traditional distance education methods. Some of the literature, however, deals with the traditional classroom and some of the faculty at Eastern were curious about the effectiveness of the computer conferencing model in an on-campus environment (Davie, 1987). A course was developed that was delivered in 1994 using the model to on and off-campus students simultaneously. The course was a senior business seminar and included 12 students. The course was generally successful but difficulties in providing formatted text materials to all members of the class was a serious problem. The development of the internet and an intranet on the Eastern campus provided the opportunity for testing another model that utilized this new and powerful medium. Given the well known problems with interaction in traditional, lecture based , instructor centered on-campus courses, an experimental course was developed that would be delivered to on-campus students alone.

The Course Design

The course chosen for this project was BA 321, Principles of Management, 5 credits. Principles of Management is a required course in the upper division core of the Business Economics program at Eastern. Its content includes individual and group processes in organizations, organizational processes, organizational design, leadership, and change. The course is normally taught in a very interactive manner in a traditional classroom with five hours per week of instructor contact. One section of the course is offered each quarter to meet the demands of the Business/Economics program.

As a course delivered via technology, the class was designed to utilize the strengths of computer conferencing and the internet to provide essentially the same level of information and activity as would normally be seen in a campus lecture based course. The internet would be used for dissemination of print and graphic materials that include the course syllabus, assignment sheets, class notes, and resource and research materials. It was also used as a presentation medium by one student group. Electronic mail and a set of six listservs were used to establish a computer conferencing system used for group discussion, class discussion, and private mail between members of the class. All activities of the class, except testing, were done electronically. Each student had e-mail and internet access from computers on campus or from their own computers off campus.

The internet materials were organized in a website housed on the campus server. Website materials included: the course syllabus, weekly assignment schedules, text chapter notes from the instructor, a set of internet links for enrichment and resource sites, and instructor developed support materials on case analysis-testing-study strategies. The ease of availability of the materials to the students was a real strength of this use of the internet. Ease of making changes was also appreciated by the instructor.

All students on the campus have e-mail and internet accounts. E-mail was utilized for conversation between individual students and the instructor and between students. Six listservs were created to facilitate group discussion. Two included the entire class with one utilized for general class discussion and the other for announcements from the instructor.

The class was divided into four groups with each having their own listserv for group discussion. Each group had specific discussion assignments each week that might include case analysis, discussion questions, response to other group's input, and general opinion on class issues. In addition, each student was 'prompted' for individual participation at least once a week. The groups were also responsible for a major term project that would be presented during final week.

Each student was responsible for the preparation of 'personal portfolio' of work that would be turned in prior to each exam. The portfolio included behavioral exercises included in the text, abstracts of internet articles, individual contributions to group discussions, discussion case notes, and one formal paper for each of the five units of the course. Students were expected to participate in group and class activities with participation a major factor in the term grade for the course. Exams were administered in a live setting every two weeks with portfolios turned in prior to the exam.

Grades in the course were based on the number of points earned during in the quarter. Five units were included in course with a an exam (100 pts), a personal portfolio (20 pts), and a case analysis (50 pts) making up the unit portfolio. 100 points could be earned by individual participation in the course. The group term project was an additional 100 points. A total of 1050 points was possible with grades being assigned on a 90%, 80%, 70%, 60% scale.

The Students

The class was composed of 27 students with 1 sophomore, 20 juniors, and 6 seniors. The majority (23) were Business/Economics majors while the remainder were from various other disciplines. Twelve students were female, the remainder male. Twenty five of the students were of traditional undergraduate age with two being in their 30s.

Student Reaction to the Course

Initial student reaction to the structure of the course was not difficult to predict. The students did not know the structure of the course until the first day of class--and it would be accurate to say that they were somewhat surprised. Once the structure of the course was explained and they were trained in the use of e-mail and the internet, they proceeded with something of a sense of adventure. In the second week, this turned to anxiety as they had to cope with the new communication format. Twelve of the group were familiar with both technologies and three were assigned to each of the groups to spread the expertise around the class. This reduced the technology anxiety to as low a level as possible. By the fourth week, the students were all sufficiently proficient to fully participate in the course with the technology being essentially transparent. This is not to say that they liked it, but they became comfortable with it.

A survey instrument was applied during final week after the course was completed. The questionnaire was composed of 43 very specific questions that asked about student reactions to the class as compared to a `traditional lecture course' and the technology used . The students were queried about the level of their effort in the class, their level of interaction with their peers and the instructor, the level of their interaction, the role of group activity, and their reactions to the technology.

Effort required of student 95%--a higher level of work
83%--an equal or higher level of writing
74%--an equal or higher level of group work
91%--an equal or higher level of individual work

Communication 70%--equal or higher task communication with peers
48%--equal or higher social communication with peers
30%--equal or higher task communication with professor
13%--equal or higher social communication with professor
13%--equal or higher knowledge of professor
83%--equal or higher quantity of writing
83%--equal or higher formality of writing

Level of Interaction 61%--equal or higher level of class participation (individual)
52%--equal or higher quality of class discussion (individual)
39%--equal or higher quantity of class discussion (overall)
74%--equal or higher level of group activity (overall)
74%--equal or higher importance of group task activity
70%--equal or higher importance of group social activity

The Class Environment 35%--equal or higher level of class energy
22%--equal or higher level of personality of class
61%--equal or higher level of democracy in class
13%--equal of higher level of convenience of class

Part II. Percentages indicate those who indicated neutral, agree, or strongly agree

The Technology--E-Mail 78%--class materials more available
65%--E-mail works to talk to instructor about class issues
69%--like to use E-mail to talk to other students
65%--like to use E-mail for class discussion
69%--prefer E-mail to phone for talking with instructor
26%--think E-mail class discussion are more interesting than live 87%--think E-mail is good for posting class announcements
78%--like E-mail and use it regularly

The Technology--Internet 83%--see the class web page as a useful tool
83%--posting the syllabus and class schedules helped them in the class

61%--internet articles and class materials on the internet were convenient
74%--using the internet as a research tool helped them in the class
83%--think what they learned about the internet was important
74%--use the internet regularly
48%--found use of the internet confusing
65%--use of the internet enriched the class
70%--accessed all the materials on the class web page

Most important--did they learn more?????????

39%--an equal or higher level of learning

The student's perception of their learning appears to indicate that they saw the technology based format as being less effective than a traditional lecture based course. Other methods of evaluation are, of course, available to compare to the student impressions. The grading system for the course gave great importance to testing of course material. The tests used were composed of 100 randomly generated questions created by the test generator provided by the textbook publisher.

This is in contrast to my `normal' tests that emphasize material discussed in class. The tests in this course were the most difficult I have ever utilized. In addition, the cases studied in the course utilized a methodology that was detailed in the text and was required to be followed by the students. Fully 70% of the course grade was based on individual understanding of course materials and procedures. With this very heavy emphasis on comprehension of the course materials, the course was much more individually based than management courses I have taught in the past. Having taught management courses for fifteen years, I have come to expect the usual normal curve in my grading with a slight skew toward the upper end of the grading scale since these students are juniors and seniors and will tend to have good study habits. In a class of 27 students I would normally expect to see 3-4 A's, 7-10 B's, 10-13 C's, 3-5 D's,. and a few F's or withdraws. I have not kept statistical records of my grades, but I feel that this estimate is accurate.

In this class, two students earned A's, seven earned B's, and 18 earned a grade of C. I was somewhat stunned by this. The grades were based on clean percentiles--(90%--80%--70%--60%) with no curve. My preliminary conclusion, for this group at least, is that they appear to have performed better on exams than I am accustomed to.

Instructor Reaction to the Course

New instructional methodologies impact both the student and the instructor. As with the discussion of student issues, instructor issues of effort, communication, interaction, and class environment must be addressed.

Level of effort required to teach the course.

The instructor role in a course of this type is fundamentally different than a traditional lecture based course. The literature on asynchronous computer conferencing speaks to the role of the professor as a facilitator of learning instead of being a central source of knowledge and understanding. The facilitator role is the model used in this course.

All of the web based materials, with the exception of the selection of some web sites, should be completed prior to the beginning of the course. This included the syllabus, text chapter instructor notes, guidance notes on cases, tests, and other assignments. The weekly schedules were developed, initially, as the course progressed. The students complained however, and by the end of the fourth week, all materials were up on the page. The weekly schedules included all group activity for the quarter. Tests also had to be prepared in advance to determine if they were `reasonable' and covered the material in a comprehensive manner. The only portion of the course that was generated on a weekly basis were the discussion questions assigned to individual students. So, there was considerable up-front preparation and course planning.

During each week of the course, extensive listserv and e-mail discussion took place in the listservs and on an individual basis between students and myself. Each morning, and I mean each morning of the week, all seven days, I received from ten to 50 messages from students in the class. A `normal' morning would include two to three hours handling class discussion over the e-mail system. These messages would include responding to assigned group or individual contributions to the discussion listservs, to assigning new questions to individuals or groups, to commentary and short lecturettes to the entire group. The interactive guts of the class were on the listservs and it was very time consuming to direct and support these discussions. I found that logging in from home was the best method and the best time was from five to eight in the morning. Keeping track of all discussions and individual and group participation was difficult because we did not utilize a true asynchronous conferencing system. The listservs worked, but a true conferencing system would have been much better organized and easier to use. Grading time was essentially the same as for a traditional course.

Overall, the technology based format takes essentially the same amount of time as a traditional class. The time is spent in different types of activity with much more individual and group based interaction and much less time spent in transmission of course material. The time structure of instructor participation is, however, in the control of the instructor. Twenty four hours a day are available for instructor interaction and direction instead of relying only on contact time in the classroom. Multiple instructional sites are available also as long as access to the server is possible.

During late fall term, winter weather created severe problems for the instructor in simply getting to campus. If the class had been held at a specific place and time, classes would have been canceled for two days. One disadvantage however, is that a tendency exists to want to participate each day--leaving no breaks in the class over the quarter. Students mentioned this as a problems and the same may be true for some instructors. It is nice to have a day off from the class-but if one is taken, e-mail would pile up.

Communications

Communication was both easier and more difficult with the technology format. The loss of the richest medium of exchange, speaking face to face, was a problem. The students indicated that this was the great weakness of the course. The presence of e-mail was appreciated and was used by the students once they became accustomed to it. E-mail traffic attained a very high level. A number of students indicated a `loss' from the course in that they did not get the opportunity to simply sit and listen to the discourse in class. Their responses on the survey instrument indicated that they did not get to know the instructor well--and they tended to value this relationship. Eastern is a small college and students are accustomed to getting to know their professors very well on a personal level. This was more difficult with the technology format. The e-mail system was very efficient and facilitated task oriented communications fairly well--but did not do as well on the social level.

Some students established a pattern visiting the instructor's office regularly for `consultation' about the course. These tended to be the better students and they repeated a pattern that is normal for this type of student whether the class is traditional or electronic.

Level of Interaction

Interaction with students in the class was higher than that in a `traditional' lecture class in that the interaction was much broader. There is a tendency in traditional classes for the professor to interact with a subset of the class that is more interested and `quicker'. The process is not very democratic in that the majority of the class, for whatever reason, tend to not actively participate. In this format, it is possible to elicit regular and quality participation with individual students without placing them at risk of embarrassment. They have time to prepare their response and the quality level of that response tends to be higher than an in-class response. The interaction level in the class tended to reinforce the idea that asynchronous interaction tends to generate more thoughtful responses from students. group responses were of an especially high quality from the groups who met to consider their responses to instructor questions. The greatest weakness of this experience was the lack of spontaneous interaction. Students did not tend to interact with each other about class materials without prompting from the professor.

When prompted, they tended to do respond thoughtfully and with some depth.

Conclusions

Generally, the students found the use of e-mail and the internet to be interesting and contributed to the quality of the course. They indicated they interacted with course material and with their groups more frequently and at a higher level than they would have in a traditional lecture course. The group work was seen as being important for both task and social reasons. They also indicated that their level of effort in the course was at a higher level both in effort and quality.

The students found the course environment to less energetic and with less personality that a traditional course. They did appreciate the level democracy in the class however. They interacted less with individuals in the course, especially the professor. They strongly indicated that their interaction with the professor on task and social issues was much less than in a traditional course.

They generally appreciated the use of e-mail as a communication medium except for class discussion. It is difficult to provide a precise explanation for this but it appears to be associated with the lack of spontaneous discussion. They generally found the use of the internet to be positive.

The students did not feel they learned as much as they would have in a traditional course though their test scores tended to disagree with this impression. Their impression appears to result from the lack of the `live' interaction they are accustomed to.

For the professor, expect essentially the same or a higher level of effort that is required for a traditional on-campus course. The up-front preparation is much greater, requiring more precise planning to compensate for the `normal' spontaneous evolution of the course in a classroom. The replacement of live interaction with electronic communication appears to create some barriers to individual student participation--at least when that interaction is about theoretical text based material-though this might not be as unusual as it might seem as this type of interaction can be limited in a traditional course also. The pattern of instructor participation in the course is different that a traditional course. All attempts to stimulate `spontaneous' discussion of the text material failed--with the exception of when specific students were asked about personal experiences that might demonstrate a particular concept. The other students tended to react to these responses. They responded will to inquiries of this type. The very successful students in the class tended to have high test scores, good writing skills, and high participation levels. The lower performing students had generally lower to much lower group participation levels though their test and writing scores varied greatly.

Bibliography

Bissel, S.A., Coombs, N.R. Medredeff, D.J., & Rogers, S.M. (1987, June). Distance teaching techniques using electronic conferencing. Paper presented at the Second Guelph Symposium on Computer Conferencing, Guelph, Ontario, Canada.

Davie, L.E. (1987, June). Facilitation of adult learning through computer conferencing. Paper presented at the Second Guelph Symposium on Computer Conferencing, Guelph, Ontario, Canada.

Harasim, L. (1987). Teaching and learning on-line: Issues in computer mediated graduate courses. Canadian Journal of Educational Communication, 16(2), 117-135.

Mason, R. (1987, June). Computer conferencing: Its contribution to self-directed learning. Paper presented at the Second Guelph Symposium of Computer Conferencing, Guelph, Ontario, Canada.

[TOP]

Trailblazing Among the Traditionalists: The Joys and Perils of Innovation

E.W. Brody, Ed.D.

Distance learning never has been a welcome concept among academic traditionalists. Successful "campus without walls" programs have been operated for decades by state-operated colleges and universities in New York, Illinois, and Califomia. They have been joined more recently by increasing numbers of non-traditional programs using computer-based public and proprietary delivery systems.

On-line searches indicate that that more than 1,000 courses today are available through the Internet, America Online and Compuserve. Some are offered by little-known institutions. Most originate with universities such as Dartmouth, Aubum, George Mason, North Dakota State, Northern Arizona, Pennsylvania State, California State, Akron, and the Universities of Florida, Wisconsin, California, Texas, Missouri, Virginia, and Washington.

Other institutions, including those of Tennessee, nevertheless have been slow to embrace alternative delivery systems. Some attribute their reluctance to academic inferiority complexes that discourage innovation. Others credit fiscal and academic measurement systems in which productivity is counted in contact hours. (Obviously, one can't have contact hours without contact.)

The origins of the traditionalist world view are less important, however, than the burdens it imposes on those who contemplate innovation and ask not "why?" but "why not?" The latter point of inquiry inevitably produces two predictable responses I first heard enumerated by our vice president for finance in a graduate seminar almost 20 years ago: "The first is 'we've never done it that way,'" Dr. Eugene Smith told us. "The second is 'we've always done it the other way.'"

The extent to which this philosophy has become holy writ at The University of Memphis never was wholly apparent before the Department of Journalism undertook to offer its masters program through CompuServe Information Service three years ago. We had been encouraged to innovate. "Make the program work and the resources to develop it will follow," we were told.

Statements of this sort fell on believing ears in Journalism. Unlike many in our discipline, the journalism program at The University of Memphis is professionally oriented. We exist to equip students to succeed in the professional world. Our faculty almost universally come to us with extensive professional experience and our allegiances thus tend to be skewed toward disciplinary rather than academic perspectives.

Our on-line program was conceived as a pragmatic response to practitioner needs. Urban perspectives to the contrary notwithstanding, the bulk of the nation's mass media is domiciled in rural and suburban communities distant from college and university campuses. Most professionals interested in accelerating the development of their careers, or merely keeping pace with fast-changing technologies, thus find themselves academically disadvantaged.

This was and is the need we sought to address. It would be nice to say "we have succeeded." The best that can be said today is that fortuitously changing circumstances have afforded us an opportunity to succeed. Early on, we were perceived as a band of heretics who somehow had managed to gain admission to the temple. We're still less than wholly welcome at family reunions - and I've personally been declared persona non grate in certain administrative quarters -- but our efforts now are at least tolerated by our colleagues.

The change in attitude was produced by two factors: demography and what might be called "political

clout." The demographic change was inevitable. Postsecondary education is afflicted by the bust that followed the baby boom, and the so called "echo" of the boom will not be clearly heard in colleges and universities before the tum of the century. The University of Memphis is no exception, and declining enrollments in our on campus programs doubtless have made our efforts more welcome than otherwise might have been the case.

While others doubtless will disagree, my personal perception nevertheless is that our program will survive and grow as much out of fortuitous political circumstances as out of economic need. Late in 1996, The Department of Journalism entered into an agreement with the National Newspaper Association to provide undergraduate journalism skills courses for NNA members' editorial and advertising departments. This agreement was presented to the NNA membership at the group's annual meeting in Nashville as the crowning achievement of the incumbent president's term of office. The association's president at the time was R. Jack Fishman, president and editor of The Citizen Tribune in Morristown, TN. Mr. Fishman was and is a member of the Tennessee Board of Regents, which governs The University of Memphis, and serves as chairman of the board's finance committee.

The department's relationship with Mr. Fishman and the National Newspaper Association - initiated by him rather than the department -may or may not have contributed to the survival of our on-line curricula. Occasional comments to the effect that I'd not want to tell Mr. Fishman that we could not or would not fulfill our contractual commitments nevertheless proved unusually effective in eliciting cooperation from those predisposed toward the status quo. The NNA contract is a relatively recent development, however, and the prior history of our efforts is of at least equal interest.

The Department of Journalism's on-line initiative began at the masters level, prompted in part by inquiries from professionals whose circumstances precluded their participating in our on-campus degree program and in part by faculty members' interests in the personal computer as an alternative academic delivery system. Our decision to use Compuserve Information Service (CIS) as a delivery medium was a function of three factors. First, the sysops (system operators or moderators) of two CIS user groups - the Public Relations and Marketing Forum (PRSIG) and the Journalism Forum (JFORUM) -were willing to provide on-line conference rooms and libraries for our use. Second, the combined active memberships of the user groups, or forums as they're popularly called - totaled some 50,000 - all potential candidates for our program. Finally, CIS software met our needs. Split screen technology permitted users to prepare their comments in one frame while reading those of classmates and instructor in another. Log files capture verbatim transcripts of every class meeting. And the CIS e-mail system supports individual and group messaging as well as file transfer.

Retrospectively, the decision to use CIS was more beneficial than had been anticipated. A number of administrative obstacles had to be overcome, but no additional university resources were necessary to initiate course delivery. Faculty computers were equipped with modems. CIS forum moderators forgave on-line charges for faculty in PRSIG and JFORUM. CIS software was free to faculty and students alike, and while CIS on-line charges were somewhat higher than those of Internet access providers, few students encountered long distance costs because of the breadth of the CIS telephone network.

The university's move to the Internet this year, as undergraduate courses were initiated under the National Newspaper Association contract, proved more difficult from technological and administrative perspectives. Those involved in developing the on-line program by then had become accustomed to dealing with unanticipated obstacles. Assurances of administrative support for the department's entrepreneurial efforts had dissipated much earlier.

Problems first arose over conflicting definitions of the term "new academic program." The Department of Journalism took the position that it was initiating a new delivery system rather than a new program. All on-line courses were identical to those taught on campus. All instructors were full time faculty members. On line and on-campus students were required to meet the same admission criteria and performance standards.

Some administrators agreed; others did not. The latter included the then-acting dean of the Graduate School. On his own initiative, he took his argument to the Tennessee Board of Regents, whose blessing

is required on all "new programs." For more than a year, as a result, the Department of Journalism was limited to offering graduate courses rather than a graduate degree program. These conditions created a distinction rather than a difference (the degree program requires 30 to 36 semester hours while the department has offered no more than six courses of three semester hours each in any calendar year) but proved to be harbingers of things to come.

Promised support from the university's public relations staff in disseminating information about the program was limited to traditional news media. No effort was made to communicate with members of the "on-line community" through the Internet, the several proprietary on-line services other than Compuserve, or the proliferating media serving those audiences. Public relations faculty in the Department of Journalism stepped into the breach, but "the story" and the program by then were several months old and were treated as such. by the media.

Responses from other components of the university were mixed. While less than obvious at the time, levels of cooperation and support varied primarily with the extent to which the functions of other departments were linked to traditional academic cycles. Problems arose involving Graduate Admissions, Records, and Information Systems, for example, although the university library, the Bursar's office, and the University Store experienced no difficulty in adjusting to meet the on-line program's six-week (vs. traditional semester) class scheduling.

While handling applications from prospective on-line students without regard for deadlines applicable to their on-campus counterparts, for example, the university's Graduate Admissions office has been unable to segregate the applications to a point at which requests for status reports can be readily met. On-line students often experience delays in receiving grade reports and up-to-date transcripts because records are updated only three times a year at the end of the Fall, Spring and Summer sessions.

The Bursar's office, in contrast, quickly installed a process through which the Department of Journalism is notified as remittances are received. Timely notification enables the department to authorize text and materials shipments on the part of the University Store, which gives these requests priority handling. Similarly, the university library quickly adjusted procedures to give students complete access to all resources. Books are sent to students by mail. Interlibrary loan and research requests are transmitted via e-mail. The library attempts to handle all requests within 24 hours and only rarely has not met that objective.

Differences between on-line and on-campus classes requiring procedural adjustments universally are administrative rather than educational. All were created to meet student needs and preferences, as identified through surveys conducted in the two Compuserve forums that served as hosts to on-line classes during the early months of the program.

Those involved expressed strong preferences for six-week rather than 12-tol3-week course formats despite the greater intensity level that concentrated courses generated. Tuesdays, 241 Wednesdays, and Thursdays were - and are - preferred for class meetings. Classes meet from 8 to 11 p.m. Central time in order to permit participation by students from all continental time zones.

Almost without exception, students have been practicing professionals in print journalism, electronic journalism, advertising, and public relations. The exceptions have been a physician - an obstetrician - who on several occasions left the virtual classroom for 20 to 30 minutes to deliver babies, and a middle manager for the European Union, who came to class at 3 a.m. Brussels time.

Time factors have proven to be a significant problem. Enrollment levels have not increased as rapidly as anticipated, precluding our offering multiple sections of classes. The single section approach demands that classes meet from 9 p.m. to midnight on the east coast and from 6 to 9 p.m. on the west. Inquiries continue to be received from Africa, Europe and Asia, but they have been too few to meet minimum class size requirements - six at the graduate level, 12 at the undergraduate.

These circumstances hopefully will change as the larger population of Internet users become aware of the program's 11 .. existence. internet usage has more than quadrupled since our initial decision to use

Compuserve as a delivery platform, while the proprietary services, including Compuserve, have suffered significant losses.

Some two dozen enrolled in one or more of the first six graduate on-line courses. Most continue in the program despite interruptions associated with childbirth, job changes, and similar events that often attend part time graduate students. Several are expected to receive their degrees this year.

The relatively small enrollments have been more a product of economic constraints than less-than-enthusiastic administrative support. Lack of adequate resources has precluded the sort of advertising - in The Wall Street Journal and elsewhere -- that accompanied Syracuse University's recent launch of a competing distance learning program. Syracuse faculty claim higher enrollment levels but the programs differ in several respects. Syracuse requires that students spend two weeks in residence but the remainder of the program consists of correspondence work. The University of Memphis has no residency requirement but scheduled classes meet on line in real time.

An aggressive on-line publicity effort targeting Internet listservs and newsgroups as well as subscribers to proprietary online services was undertaken by journalism faculty a few weeks ago. The effort coincided with the "relocation" of graduate courses to the Internet and the start of undergraduate courses there, a process that proved more difficult than anticipated.

The Department of Journalism had secured what were considered to be firm commitments for necessary support from other university components before entering into the National Newspaper Association agreement. A server, software, and technical support involving expenditures totaling some $40,000 were involved.

The contract was signed, but the commitment proved less than binding. First no funds were available for the server. Journalism faculty persuaded academic administrators to make that purchase. Then there was no money for software. The university's Extended Programs department covered that shortfall. Then the Department of Journalism -with more than 300 students and two of 13 faculty on leave - was asked to staff the technical support function.

These obstacles were overcome, although not without ill feelings, and faculty were preparing as this was written to implement what ultimately may become a true virtual classroom. Netscape's Navigator 3.01 and The ForeFront Group's RoundTable 2.0 were the first software programs deployed. Clients for both PC and Macintosh can be downloaded by faculty and students without charge. The university purchased a RoundTable server license for some $1,200.

RoundTable provides a white board as well as videotext. Faculty load documents to be displayed as Intemet pages and place them on the white board as needed. One-way (faculty-to-student) audio is to be added in the near future and plans call for two-way audio and video as soon as bandwidth obstacles can be overcome.

Other software now in developer beta testing also may be added to facilitate on-line testing and other functions. Among features most sought after by faculty: a timed testing capability accompanied by random question selection that would enable automated administration and scoring of objective tests. To date, most on-line examinations consist of timed essay tests requiring that students synthesize the information they've digested rather than reading and regurgitating textbook content.

Concern over the integrity of on-line testing systems has been expressed on several occasions. Faculty believe that questions requiring synthesis of information coupled with time limits that preclude students seeking answers in books provide adequate safeguards.

"How do you know that it's your students who are answering the questions?" There are no guarantees, of course, but it's unlikely that students would hire substitutes to participate in online class meetings and take tests. Class participation usually is weighted heavily for grading purposes because computer software captures and stores every word that appears on the monitor and resulting files can be retained indefinitely.

Faculty consider the on-line delivery system as secure as any on campus, especially in the wake of an incident in which on-campus students hired "ringers" to take tests for them. The deception would not have been detected had another student not betrayed the conspirators to a faculty member.

No system is perfect, of course, but the risk of cheating is inadequate to disqualify a delivery system that can bring postsecondary education, continuing education, and professional development - for-credit, for CEU credit and not-for-credit - to a huge international constituency of unserved and underserved professionals. Demographically-driven declines in numbers of high school graduates add an economic argument in favor of alternative academic delivery systems, of course, but the obligation to better prepare students for increasingly competitive occupational environment and enable them to maintain their competitiveness over time should be sufficient to encourage academics to develop and use every available delivery system to those ends.

[TOP]

Developing Critical Thinking Skills in a Technology-Related Class

Karen Jarrett Thoms, Ph.D.

Najmi Junaid, Ed.D.

- Abstract
- Developing Critical Thinking Skills
- Socratic Questioning
- Segue to Technology-Based Classroom
- The St. Cloud University Example
- Conclusion
- References

Abstract

Students are expected to be able to think critically. As more courses become technology-based and increased emphasis is placed on technology applications, educators need to strive to develop students' critical thinking skills. This presentation will address critical questioning as a requirement for critical thinking and will describe techniques and resources for including critical thinking in technology-based courses. Participants will explore Socratic questioning and see how this technique can be incorporated into a classroom that is predominantly technology-based.

Developing Critical Thinking Skills

Just what is a critical thinker? According to Richard Paul, a critical thinker is someone who is able to think well and fairmindedly about his or her own beliefs and viewpoints as well as those which are diametrically opposed. The critical thinker does not just think about these beliefs and viewpoints, but explores and appreciates their adequacy, cohesion, and reasonableness. Attitudes and passions are included. To become a critical thinker is not to be the same person you are now, but only with better abilities; it is to become a different person (p. iii)

Critical thinking is expected (at least by state departments of instruction, university curriculum committees, and educators) of students. This skill, however, must be developed, and it requires a great deal of effort on the part of teachers to help students learn to think critically. In order for students to develop these skills, teachers must learn to incorporate critical questioning into their classes; the responsibility for developing the critical thinking skills shifts from the student to the teacher as questioning becomes the guiding force. It is the teachers, not textbooks, that have the power to shape students' ability to think (Chalupa and Sormunen).

Critical thinking and critical questioning can be incorporated into nearly every course. However, the technology-based courses introduce a challenge as well as an opportunity. This presentation will discuss critical questioning (referred to as Socratic questioning) techniques and how they can be incorporated into a technology-based course, given the electronic resources available.

Socratic Questioning

Socratic questioning is at the heart of critical thinking; it is more than eliciting a one-word response or an agreement/disagreement from students. In a short sentence, Socratic questioning requires students to

make assumptions, distinguish between relevant and irrelevant points, explains points, can be highly elaborated or undeveloped; and may be mono- or multi-logical. Socratic instruction can take many forms. Paul (p. 270) states that Socratic questioning:

- raises basic issues
- probes beneath the surface of things
- pursues problematic areas of thought
- helps students discover the structure of their own thought
- helps students develop sensitivity to clarity, accuracy, and relevance
- helps students arrive at judgment through their own reasoning
- helps students note claims, evidence, conclusions, questions-at-issue, assumption, implications, consequences, concepts, interpretations, points of view Q the element of thought.

A Taxonomy of Socratic Questions

To make the Socratic questioning method readily usable by teachers, identifiable categories of questions have been established (Paul, pp. 276-77):

- questions of clarification
- questions that probe assumptions
- questions that probe reasons and evidence
- questions about viewpoints or perspectives
- questions that probe implications and consequences
- questions about the question

Questions of clarification

Questions of clarification are basically asking for verification, additional information, or clarification of one point or main idea. The student would be expected to provide the information, expound on an opinion, rephrase the content, or explain why he/she made that particular statement. Clarification may also be requested from others in the discussion group.

Questions than probe assumptions

Many questions can center around the concept of assumptions. The student may be asked for clarification, verification, explanation, or reliability of the assumption. Students may also be asked to identify another assumption which might apply to the particular case.

Questions that probe reasons and evidence

This category of probing questions asks for additional examples, evidence which has been discovered, reasons for making statements, adequacy for the reasons, process which lead student to this belief, or anything which would change the student's mind on this issue.

Questions about viewpoints or perspectives

The student might be asked whether there are alternatives to this viewpoint or perspective, how might other groups or people respond, what argument a person might use who disagrees with this viewpoint, or a comparison of similarities and differences between viewpoints.

Questions that probe implications and consequences

The student might be asked to describe and discuss the implication of what is being done or said, the effect which would result, the alternatives which might be feasible, or the cause-and-effect of an action.

Questions about the question

The student might be asked to identify the question, the main point, or the issue at hand. In addition, the student might be asked to break the question into single concepts rather than multiple concepts or determine whether some type of evaluation needs to take place. The student or discussion group may also be asked to identify why this question is important.

Segue to Technology-Based Classroom

The first part of the presentation identified how critical thinking on the part of students depends a great deal on the critical questioning skills of the teacher. We have seen clear examples of using critical questioning in a class which is largely discussion. Once a teacher masters critical questioning skills, there is the next step which must be mastered Q incorporating these skills into a classroom where technology is a large part of the course.

Including Critical Thinking in Technology-Based Courses

Incorporating critical thinking into a technology-based course places additional responsibility on both the students and the teacher. Global technology and information access provide the substance for research and discussions, and the instructor and students provide the final step Q assimilation and incorporation of information.

The Technology-Related Classroom

The dynamics of the educational process rest on two essential components: communication and resources. Information technologies can so enhance classroom communications and resources that, when properly applied, they can transform conventional pedagogical paradigms and create new powerful context for learning and teaching. Connected classrooms potentially offer open-ended, dynamic, discovery-oriented learning experiences. The more advanced the classroom use of telecommunication is, the greater the potential to change the learning environment, the teacher's role in the classroom, and the flow of information to students overall classroom dynamics; each can evolve to form more natural and much richer learning processes.

Technology-related classrooms are those classrooms where learning is structured around primary concepts, whole to part, with emphasis on the big picture. Students are viewed as thinkers with emerging theories about the world. Lessons are not arbitrary, but build on issues relevant to the student. In a technology classroom, teachers behave in an interactive manner, mediating the environment for students. "Guide on the side not a sage on the stage." Pursuit of student questions and opinions is highly valued and activities rely heavily on primary sources of data and manipulative materials. Assessment of student learning is interwoven with teaching and occurs through teacher observations of students at work and through student presentations and authentic projects. Frequently the student work is collaborative. In a nutshell, computer-based technology instruction is about conceptual understanding demonstrated through application, typically on projects using primary source materials. In other words, emerging technology is incorporated with critical thinking in technology-based classrooms. Important features of these classrooms are: access, operability, organization of resources, engagement, ease to use, and functionality of information.

Developing critical thinking skills in technology-related classrooms is quite a challenge for teachers. Since information is the principal ingredient of much learning, instructional design and teaching in an information-rich environment will be carried out differently than in traditional environments. The learning process will be characterized by a new theory of applied learning, with a new role for the teacher and new instructional design.

The role of the teacher is going to be modified in a very important way, with leading and guiding taking over from giving information. The chaotic nature of the Net will require teachers in particular to assist students in questioning the world around them and judge the validity of information accessed, thus sharpening critical thinking and imagination.

Online teaching becomes very much a content matter, if not an outright curriculum matter. Selecting specific content to be read by students in a course of study loses its function when a wide variety of appropriate material is accessible on the Net. Course design focuses then on the objectives to be achieved and not on the means of achieving them, a strong shift in our instructional design paradigm (Duchastel & Breuleux, 1996). The specification of learning objectives at a higher level of generality, one which permits different students to achieve these objectives differently (through different projects, through learning different content, etc.), is more in tune with emerging information Net context than is the traditional model.

In this presentation we will concentrate on only one technology: Internet as a source of this information-rich environment. How it helps to enhance critical thinking depends on how we use the latest development of Internet technology, called Infosphere (Brenfeld, 1996). This portion of the presentation will be based on five general educational functionalities of the Infosphere (Berenfeld, 1996):

- tele-access
- virtual publishing
- tele-presence
- tele-mentoring
- tele-sharing

Each is discussed in further detail in the following paragraphs. Please keep in mind that the Internet will be the primary source of information.

Tele-access

Students use online resources in learning including libraries, databases and other classrooms. When students use an online search, they get into real world databases, and they construct their own knowledge. They can access unlimited information from any place.

Virtual Publishing

Students can publish their projects by using virtual publishing on the World Wide Web. They can publish multimedia projects as well as hypertext documents.

Tele-presence

Tele-presence enables the students to experience events on remote sites. With the use of video technologies, students can actually be present at remote sites. Classes can journey on real expeditions and participate in real experiments, without students actually leaving the classroom.

Tele-mentoring

Mentoring through telecommunication is the most important and rich learning option for students. When students get responses to their questions from scientists or scholars (who serve as online mentors), they get expert views beyond the textbooks' "knowledge".

Tele-sharing

Tele-sharing often begins with simple e-mail chats between "keypals". It advances to "one-to-many" and "many-to-many" communications, and then blossoms into sharing of resources, ideas, experiences, data and findings. Students can share the communication and knowledge in small groups as well as large groups.

These educational functionalities of Infosphere can enhance the critical thinking skills and critical questioning. But the success of these functionalities depends on high level connectivity and mastery of

some of the metaphors and their functionalities. Teachers need to develop the telecommunication-based curriculum modules in these courses. In this presentation we will sample such a course developed and taught at St. Cloud State University, where some of Infosphere functionalities (tele-accesing , tele-sharing, tele-mentoring) were used.

The St. Cloud State University Example: IM 204: Research Strategies (MGM)

This course was designed to examine basic university-level research while utilizing multicultural, gender, and minority content and issues in library learning resources. A large number of these students were incoming first-year students, while others were more advanced. All were introduced to technology-based research gathering opportunities.

Course Requirements

Students in this course were given specific course requirements, as noted below:

a. Students were placed into groups and were required to read one book from the reading list. Each group was required to initiate the discussion in the class and write a book report.

b. Students were required to write five individual abstracts outside class.

c. To master the research strategies, students were required to use telnet and Internet, fetch, gopher, and Usergroups for their research and assignments.

d. The course was divided into different modules. Each module was a complete unit of instruction. Students were required to select one module and write a final research paper by using multimedia information research technologies.

Student groups were required to read one book from the reading list. Each group was required to initiate the discussion among its members by posting members' critical evaluations of books on the group's user group. After group tele-discussion, each group wrote a book report based on guidelines provided by the instructor. Six groups read three books and presented the book reports in large group in class. These user groups were open user groups, where any student from another group could read the critical evaluation. Students used tele-sharing to write the book report.

For the research paper, every student selected one module and used Internet, online searching, CD-ROM, and video to conduct their research. Some students interviewed the author of the book and defended his/her thesis. Students not only gathered data from books and journals, but they also used authentic knowledge to support their theories. Papers were presented on a variety of different issues: human rights, sexual harassment, race and discrimination, immigration, and poverty related to Native American, Mexican and Hispanic and other ethnic groups.

Conclusion

Critical thinking is based on critical questioning, just as critical questioning is strongly linked to searching out the whys and wherefores, the what ifs and what others. Not only can teachers use critical thinking and critical questioning in traditional classroom formats, but they can also incorporate activities in the technology-related classroom which will teach students critical thinking skills. By being well prepared with the discipline content and knowledgeable in the use of critical questioning, today's teacher

can prepare students to access information on a world-wide basis. By accessing data and information, students gain knowledge; by using the knowledge they have gained, students achieve power in the information world.

References

Berenfeld, B. (1996), "Linking Students to the Infosphere", *Technology Horizon in Education* (T.H.E. Journal) 23 (9), 76-83.

Chalupa, Marilyn, and Carolee Sormunen. "You Make the Difference in the Classroom: Strategies for Developing Critical Thinking", *Business Education Forum*. February 1995, pp. 41-43.

Duchastel, P. & Breuleux, A. (1996) A Web-based model for university instruction. In preparation. http://www.crim.ca/~pduchast/model.html.

Paul, Richard. *Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World*. Rohnert Park, CA: Center for Critical Thinking and Moral Critique. 1990.

[TOP]

The Virtual Global Village: The World Wide Web, Instructional Technology and the "Communicative" Language Classroom

J. Blake, Ph.D.

- Abstract
- The Role of Instructional Technology in the "Communicative" Foreign Language Classroom
- CD-ROM
- World Wide Web
- Network-based Communication
- Teaching with the World Wide Web: A Compilation of Web Sites Useful in the Foreign Language Curriculum
- Orientation to the Internet
- Pedagogy
- Foreign Language/Cultute Specific Resources
- Integration of E-Mail and "Chat Groups" in the Classroom

Abstract

The "discovery and conquest" of the Internet and its application to the teaching of foreign languages and cultures has created some very serious pedagogical problems. The interest in Instructional Technology appeared on the horizon at a moment when theorists of foreign language acquisition were promoting notions of "proficiency-oriented" and "interactive" teaching for cross-cultural communication. The digital realms of the Internet, the WWW, CD-ROM, and Network-based communications should immerse students in "task-driven" cultural studies. This field of expansion has presented a dilemma to foreign language teachers, who have had to face the issue of proper contextualization of these activities. Digital technologies can promote a more student-focused environment only if the teacher examines what is happening in the classroom before the addition of the use of any of the computer technologies. The World Wide Web as properly applied in this effort provides quick and unrestricted access to authentic materials, in the form of text, sound and images.

The Role of Instructional Technology in the "Communicative" Foreign Language Classroom

When the word "technology" is mentioned along with language teaching, teachers often feel intimidated, imagining that perhaps their employment is somehow threatened and that being replaced by computer-assisted reaming looms on the horizon. No doubt some administrators may have this in mind when they fund pilot programs which have a technological basis, yet, teachers should not fear, since language is a social phenomenon and as such will always need to be taught with the social dimension only made possible by meaningful personal interaction in the classroom. The real presence of teacher and students in the classroom setting cannot be replaced by technology, but the language teacher who does not utilize technology in the classroom will, in all likelihood, be replaced by the language teacher who does.

The best way for a student to learn a language has always been to travel abroad for a "total immersion" experience, which should be structured. Yet, since most students are unable to do this, technology can play a critical support role. Technology can serve to increase the learner's contact through a wide variety of authentic materials within the traditional framework. Foreign countries and their cultures can co-exist with the learner in the virtual, or electronic, classroom. Far from eliminating the role of the teacher, the

electronic classroom presents a challenge to determine how the teacher can inform learners of what works or what does not work in the electronic classroom.

As we refer to this electronic classroom, there are three areas which we need to examine and define: **CD-ROM, the World Wide Web, and Network-based communication.**

CD-ROM: In the future most beginning and intermediate level foreign language textbooks will be marketed by publishing houses with an accompanying CD-ROM program, which is usually promoted as being "interactive". The classification and definition of "interactive" differ widely, but there is no denying that publishing houses have moved in this direction, as, among other reasons, this packaging has become attractive to teachers and students. And there is no denying that the multi-media approach to foreign language learning does sell textbooks. But there will be questions which remain regarding how to evaluate the quality of each textbook - CD-ROM package and how to integrate those activities into what should already be going on in the classroom in terms of communicative teaching.

World Wide Web: The availability of foreign language materials on the World Wide Web has increased dramatically in the last two years. It is the ultimate source of authentic materials in the target language. Through an Internet browser, such as Netscape, students can access authentic reading materials from Paris, Madrid, or other place where the language is spoken. Despite the increase in the number of Web site, teachers have few guidelines on how to be selective of pertinent materials at the Web site or how to incorporate these electronic materials into the curriculum systematically. The examination of how this is best accomplished for application with existing texts should be a top priority for foreign language educators. Students should be encouraged and guided carefully as they work with these Web materials at home or in the lab, by answering questions and performing tasks on-line, the results of which may be emailed to their instructor's e-mail account. Featuring Java script and CGI script enhancements can make these materials locally interactive. The present writer has set up a Web-page at http://www.geocities.comlParis/LeRBank/4484, at which he has his students visit and log in to accomplish certain assignments. Hyperlinks can be established to other pertinent Web sites which students are assigned to visit and perform specific tasks. Any assignments given on the World Wide Web must be "task driven, with the instructor supplying specific goals and objectives with care and attention given to effective integration of Web-based materials and researches into the existing curriculum. Students must be able to observe a correlation between what they are assigned to perform on the World Wide Web and what they are doing in the classroom.

In the future Web-based sections at the end of every chapter or unit of study in foreign language textbooks will become the norm. But as authors turn their attention to this area, teachers must be careful to choose sites for their stability and technical reliability. Fortunately, there are many governmental and commercial sponsors which are producing informative Web pages about their respective cultures and peoples.

Network-based Communication: Writing and reading are two activities which can be well-supported by the Internet environment. Teachers and students routinely use e-mail to communicate in the target language with each other. Other useful network tools include IRC chat, Use-net groups, listservs or MOOs (multi-user domain object-oriented), or Cyber-cafes. Distance learning RTA, or remote technical assistance, enables students and instructor to carry out collaborative learning over the Internet from remote locations.

All these Intemet tools enable the students to increase their use of the target language to. negotiate meaning, free from the constraints of meaning imposed by the time usually invested in the traditional classroom delivery mode. Foreign language professionals should be pioneering the use of these technologically-based tools in order to show the students how technology can enrich the curriculum.

We all have the responsibility for incorporating technology into our curriculum; not to take advantage of the emerging technologies is to abdicate our role as educational leaders. The use of technology makes the role of the teacher more, rather than less, important; technology will certainly never replace the role of the teacher.

However, before we in foreign languages become too distracted with the potential applications of technology in our classrooms and language laboratories, we should consider whether we are already teaching how to communicate in the classroom, and- if we are, how it would affect the use of technology. All language instruction should be properly task-driven; the classroom should be input-rich, and information-exchange tasks should form the unit of instruction. This would mean that language learners work together to solve a problem, answer a question and use communication as a means to an end.

Yet, when we begin to assess the extent to which we have true communicative language teaching at all levels of instruction, it becomes clear that we are far from being a communicative nation. Even now, the vast majority of curricula seem to be grammar-driven, and tests, likewise, follow suit. In curricula such as these, communication would seem to be an add-on or serves to practice the grammar, which does not exist at the service of communication, as it well should.

Before language departments begin to invest in technology, faculty should reflect upon whether our classrooms are as they should be; technology should not drive the curriculum, but rather, the curriculum should drive the technology. The multi-media lab cannot substitute for what should be happening already in the classroom, and the extent to which technology can be used in language teaching depends on how language classes are already being conducted. Information tasks, interviews, and construction of information should be the focus of classrooms in which one day does not go by when students do not divide up in small groups to use language for some meaningful purpose.

In the grammar-based and grammar-testing classroom scenarios, technology could be utilized to supplant most, if not all, class time, and this would constitute an attractive situation for budget-constrained administrators. In higher-interactive and task-based communicative classrooms, technology can only serve as a supplement. For the task-based and communicatively-driven classroom environment, the proper application of technology is the challenge facing the instructor. If it is the consensus that grammar structuring does not lead to communication, it can be asserted that the outcome of communication-based curricula can be enhanced by appropriate supplemental activities that have a focus on processing grammatical form. Processing instruction as properly utilized is distinguished by an input-based and meaning-driven focus on grammatical form and structure. In a multi-media language lab environment students can benefit from carefully designed processing instruction which incorporates visual, oral and textual stimuli into its design.

Together with grammatical structure, processing instruction in a multimedia environment can assist in the development of the reamer's pragmatic abilities, or the learner's ability to study speakers' intentions and how those intentions are interpreted by the hearer. In second language cross-cultural pragmatics, there is evidence that many communication difficulties arise because second language learners either use inappropriate pragmatic devices when speaking or misinterpret native speakers' pragmatic devices. Given appropriate visual input in the multi-media lab, students can develop an awareness of pragmatic communication as they are delivered that visual input, which they observe intuitively.

Technology in any form can only serve the already existing communication-based classroom, not create it. The first order of business is to examine the way we conduct our classrooms, asking ourselves whether they have indeed reached their communicative potential. Only then should we turn our attention to issues of software, the World Wide Web and balancing the new technologies. In a task-based classroom a task cannot happen the same way electronically that it can in the traditional classroom.

A network-based classroom challenges students to set up a series of tasks which they can accomplish outside of the classroom; students return to the classroom to report their activities, so what is being accomplished is the enhancement of communicative activities targeted for the classroom, but at the students' own convenience. Properly integrated, technology and communicative activities include content which is important cognitively, culturally and personally to the learners. Communicative learning does not base itself or depend upon the technology itself, but rather is facilitated by it.

Language teachers should not aspire to use technology for the sake of using technology; there must be an improvement over what we are already doing. Technology should be used to bring authentic culture

content to the foreign language learner. In terms of curriculum design it is difficult to address whether a technology-based approach is more effective than a traditional approach, if classroom time is substituted with computer-based time, because when an additional component is added to an existing curriculum, there is additional input; it is then difficult to discern whether the net effect is due to more exposure or to the actual impact which a given technological medium might have on language development.

There is indeed a close fit between the structures and processes of the World Wide Web and some of the main structures and processes of university education. Launching students to WWW assignments can act as a powerful reinforcement of many forms of teaching and learning; Students are provided access to authentic materials which are not conveniently obtained through traditional means. The WWW also facilitates the invention of unusually rich course materials through hypertext links to relevant reference materials, which, when creatively appropriated through task-driven assignments, can be unusually engaging and demanding. The Internet also dramatically enhances the process of daily exchange of ideas between students and faculty because it creates a wide array of electronic forums for what has been called "conversational" learning. While the Internet will never serve as a substitute for sustained human contact, it does significantly extend the scope of certain forms of interaction. Moreover, the Internet allows the students to be more active agents in the learning process, further reinforcing the idea which should already be in place in the classroom: namely, that the student assumes the role of active learner and is not just a passive recipient of knowledge from the instructor and the texts. The Internet has the power to reinforce what is already embraced as communicative teaching and learning in the classroom; but the intriguing potential of the new technologies must not be allowed to drive us toward innovations that serve to erode rather than reinforce sound foreign language curriculum content.

Teaching with the World Wide Web: A Compilation of Web Sites Useful in the Foreign Language Classroom

Orientation to the Internet

http://www.december.com/web/texVindex.ht ml

General guide for the novice; gives basic information through many Hyperlinks for getting started exploring, browsing and connecting with people.

Pedagogy

http://k12. cnid r.org :90/resource.cntnts. html

Excellent site for addressing the proper application of the World Wide Web in the K12 classroom, creation of Web pages for class use, and online discussion groups.

http://polyglot.lss.wisc.edu/lss/lang/teach.html/#llc

Presents an assortment of ideas for using WWW resources as a teaching tool, as well as links to sites on pedagogy. Includes specific lesson plan suggestions, such as "City Net", "Metro Link", and "World News Tonight". Links to language-specific activities for French, Spanish and German.

http://www. utsa.edu/aetf/twiafaq. html

AATF list of Hyperlinks addressing frequently asked questions about teaching with the Internet. Deals with such issues as finding good ideas for using Internet activities in class, where to find technical information about Internet and French vocabulary for technical Internet terms, where to find cultural resources, and ideas for correspondence scolaire and other online exchange programs.

http://www.classroom.net

Classroom Connect Newsletter. Wriffen to aid teachers (K12) find and use Internet resources in the classroom. Suggestions for online activities, keypal addresses and lesson plans.

http://web66.coled.umn.edu/

Helps direct teachers (K12) as they plan purposeful Internet projects, with attention to motivation, assessment and outcomes.

http://agoralang.com/agora/agoranews current.html

The Agora Newsletter contains useful infommation dealing with cyberspace issues and application in the foreign language classroom.

http://vww.fln.vcu.edu/samples/forms.ht ml

This site provide examples of using the WWW and HTML "Forms" for instruction through Hyperlinks.

http://members.aol.com/maestro1 2/web/writing.html

Instructions on how to write activities for the Web. Includes links to search engines and sites that link.

http://fromnowon.org

An on-line educational technology journal maintained by Jamie McKenzie, an educator who regularly updates the offerings here and provides much insightful commentary regarding the proper application instructional technology in the classroom.

Foreign Language/Culture Specific Resources

http :llwww. itp. berkeley.edu/-thorne/H u manResou rces.html

This is a resource list which, although not comprehensive, does give excellent starting points for exploring foreign language/culture specific topics. Covers many languages, including French, Spanish and German.

http://www.forlang .utoledo.ed u/BOOKMARK/BookmarkFRN.html

Excellent assortment of cultural, geographical and language specific sites.

http://www.sussex.ac.uk/langc/welcome.html

Includes the Virtual CALL Library, with language software to download and language resources through many links from the Language Centre at the University of Sussex.

http://www.iat.unc.edu/guides/irg-29.html

Selected sites of French language resources on the Internet.

http://www.utm.edu/departments/french/french.html#finding

Contains a wide range of French curriculum Hyperlinks.

http://www.iat.unc.edu/guideslirg-08.html

Provides links to resource pages, curriculum planning ideas and class activities for creative teaching methods in French.

http://www.uji.es/spain_www.html

Search engine plus interesting tourism and cultural information on Spain.

http://www.allison.clark.neVpub/lschank/web/foreign.html

Provides a wide array of links to foreign language and culture sights, with some emphasis on German.

http://www.imaginet.fr/momes/

Widely diverse site directed to children, but of interest and application to all ages; this site is an excellent example of how productive an educational experience that a Web site can be.

Integration of E-Mail and "Chat Groups" in the Classroom

http://www. stolaf. edu/network/iecc/discussion/classroom. html

Provides discussion of projects and interactions possible by e-mail between classrooms, centering around specific projects.

http://www.itp.berkeley.e

The High-Tech Humanist: Multimedia Computing in a Senior Applied Ethics Seminar

William J. McKinney

- Abstract
- Introduction
- The Class
- Asynchronous Techniques
- Off-the-Shelf Multimedia
- Authorware and Beyond
- Conclusions

Abstract

Improved computer technology presents philosophers with the means to enhance their applied ethics classes by providing the opportunity to explore myriad practical and conceptual problems heretofore impossible in the traditional classroom. This paper examines some of the potential, and some of the problems, inherent in using computerized techniques in Southeast Missouri State University's Environmental Ethics class. It concludes that when a full battery of interactive and asynchronous techniques is combined into a traditionally Socratic environment that the essentially dialectic nature of the humanities is preserved, while simultaneously incorporating powerful new teaching and learning styles which are vital in applied ethics.

1.0 Introduction

Environmental Ethics is that strangest of philosophical disciplines. On the one hand, it is steeped in traditional ethical theory. No course is complete without its requisite nod to the "big names" in Western ethical theory. In a Kantian mode, we ask, "What is our obligation with respect to the non-human natural world?" and, in a more modern vein, do non-humans have rights in any coherent sense, that is, do we have obligations to them, and them to us? For that matter, we may ask if future generations, both human and non-, deserve moral consideration. Do our future great-grandchildren have some sort of moral claim on us right now? Of course, we can also ask, in a more utilitarian sense, if the consequences of action X are more or less beneficial, and whether or not animals and forests count in the grand scheme of moral calculation. Many questions in environmental ethics are, however, of a less traditional, but nonetheless theoretical, ilk. Are the fundamental assumptions of modernism inherently anti-ecological? Are women socialized to be more ecologically friendly than men?

While these, and surely many, many more, theoretical questions form the foundation of environmental ethics and philosophy, they are surely not the end of the matter, for as an applied ethical discipline,

environmental ethics must also ask questions such as, "Is it wrong to burn the rainforests, and if so, why?", "If a company obeys all environmental regulations, is it then, by default, `doing the right thing'?" and, ultimately, "How should I conduct myself in the context of the broader environment?"

`The challenge which faces environmental ethics instructors is precisely how to make such a class accessible to a wide range of students, while simultaneously maintaining both theoretical rigor and practical relevance. No longer can humanities instructors be content to simply offer courses for their majors and the handful of other interested students. External pressures demanding programmatic accountability dictate that departments regularly demonstrate their centrality to institutional mission and core curricula. Applied ethics classes are natural draws for philosophy departments, in that they offer the opportunity to explore foundational theory, while offering content that is timely and relevant, a sure attraction to students caught up in the new "consumer culture" that is contemporary higher education. I maintain that computer-assisted techniques offer a means of preserving what is most central to the humanities -- the Socratic method, while simultaneously providing a means of extending its reach into the vocationalized culture of contemporary academe. There are myriad applications for computer-assisted instructional techniques in the humanities. The traditional dialectical approach of the humanities may be preserved, even enhanced by such techniques. The technology-enhanced nature of my environmental ethics class stands as one example.

2.0 The class: UI429 "Environmental Ethics"

It is important to remember that technologically assisted instructional techniques must be driven by the objectives of the course or course unit. Too often, instructors get caught up in the "bells and whistles" and "whiz-bangs" of the available technology and, as a result, forget that there is good, basic course material that may not be enhanced by the presence of computer-assisted techniques. Thus, when I first had the idea of incorporate multimedia approaches into environmental ethics, I took a long hard look at precisely what I promised would be accomplished in the class. Below is the course approval documentation required of all upper-level interdisciplinary courses at Southeast Missouri State University.

PROPOSED COURSE SYLLABUS
UNIVERSITY STUDIES PROGRAM
Southeast Missouri State University

Department: Philosophy and Religion
Title of course: Environmental Ethics

I. Catalog Description of and Credit Hours of Course: Comprehensive study of the ethical, social, scientific and cultural problems associated with the use and abuse of natural resources. Three (3) credit hours.

II. Interdisciplinary Nature of Course: In analyzing the ethical problems of environmental issues, this course will draw on material from the categories of:

Logical Systems: statistical, inductive and deductive reasoning used by scientists, engineers, ethicists and activists in constructing arguments defining and addressing environmental problems

Physical and Living Systems: analysis of case studies detailing environmental problems from the standpoint of environmental science and ecology

Social, Economic and Political Systems: environmental problems are, in general, social problems, and consequently, economic and political problems, and those environmental problems brought about by human intervention in nature are usually the result of social, political, economic and/or cultural forces

Literary Expression: from the Bible to Silent Spring, the non-human environment has always been the subject of literary interpretation; since these interpretations are a part of our culture, they must be examined in tandem with the scientific and ethical issues

The broad base of this course meets the interdisciplinary course requirement, and thus the course should receive a 400-level designation.

III. Prerequisites: Completion of the University Studies Core Curriculum

IV. Purposes or Objectives of the Course:

1. To understand the basics of ethical theory, and how these can be applied to environmental problems. (Objectives: 2, 7)

2. To familiarize the student with the basic motivations underlying the development of the sub-discipline of environmental ethics. (Objectives: 2, 4, 7, 8)

3. To investigate the various models proposed to account for ethical behavior within an ecological context. (Objectives: 1, 2, 6, 7, 8, 9)

4. To allow the student the opportunity to explore various multi-cultural perspectives on environmental issues. (Objectives: 1, 2, 4, 5, 9)

5. To investigate the scientific and technical details of the ecological problems which give rise to environmental ethics disputes. (Objectives: 1, 2, 6, 9)

6. To encourage scholarly research on, and analysis of, the issues and problems addressed in the course. (Objectives: 1, 2, 3, 7)

V. Expectations of Students:

1. To attend class regularly.

2. To be prepared to participate in class discussions based on sets of homework questions.

3. To be prepared to hand in the answer to one homework question per week.

4. To read the assigned texts and articles.

5. To complete preliminary independent research culminating in a proposal for a final position paper.

6. To complete the mid-term and final exams (take home).

7. To undertake an independent research project, of appropriate scholarly quality, culminating in a position paper taking a position, pro or con, on one of several environmental issues.

8. To present a summary of the position paper for class round table discussion.

VI. Course Outline

Unit I: Primer in Ethical Theory

Week 1: Introduction, Ethical Relativism, Egoism
Week 2: Utilitarianism, Altruism, Kant and Rawls

Unit II: Primer in Environmental Ethics

Week 3: Historical Roots of Environmental Ethics
Week 4: Contemporary Catalyst: Ecological Problems of the 1970's

Unit III: The Science of Ecology and the Ethics of Interconnection

Week 5: The Science of Ecology
Week 6: Environmental Ethics in an Interconnected World
Week 7: Environmental Problems in an Interconnected World -- to include a selection from the following case studies:

Global Warming
Food and Water Quality and Quantity
Ozone Depletion
Rain Forest Degradation
Acid Precipitation

Unit IV: Readings in Environmental Ethics

Week 8: The Rights of Future Generations
Week 9: Models and Scientific Method in Environmental Ethics
Week 10: Cost-Benefit Ratios: Examining Benefit and Harm in Environmental Ethics
Week 11: The Ethics of Industrial and Population Growth on a Global Scale

Unit V: New Frontiers in Environmental Ethics

Week 12: European and North American Perspectives
Week 13: Latin American, African and Middle Eastern Perspectives
Week 14: Asian Perspectives and the Growth of Eco-Feminism
Week 15: Position Paper Presentations

Text Books and Assignments:

Upstream/Downstream (Temple Univ. Press, 1990), Chapters 1-8

Ethics of Environment and Development (Univ. of Arizona Press, 1990), Chapters 1-21

One Earth, One Future (National Academy of Sciences, 1990), Chapters 1-7, 8-11

Handouts and select reserve readings, including:

Feinberg, J. Reason and Responsibility (Wadsworth Publishing Company, 1989) pp. 462-573
Grove, R. "Origins of Western Environmentalism," Scientific American, July 1992, pp. 42-47.
White, L. "The Historical Roots of Our Ecologic Crisis," in Mitcham, C. and Mackey, R., eds., Philosophy and Technology (New York: The Free Press, 1969) pp. 259-265.
Zimmerman, O.T. and Lavine, I. DDT: Killer of Killers (Dover: Industrial Research Service, 1946).
Carson, R. Silent Spring (Fawcett, 1962), select chapters.

VII. Basis of Student Evaluation

Participation in class discussion and completion of weekly homework: 25%
Mid term take home exam: 25%
Environmental Position Paper and Proposal: 25%
Final Exam: 25%

VIII. Justification for Inclusion in University Studies Program:

1. Demonstrate the ability to locate and gather information

Emphasis: Considerable

Course Content: This objective is addressed tangentially by the course content inasmuch as the location and identification of relevant evidence and data is essential to environmental science, as is the determination of what, precisely, "relevant data" means.

Teaching Strategies: Lectures and class discussions will be used to help to identify potential sources of information for the student position papers and paper proposal assignments.

Student Assignments: Class assignments -- the position paper, paper proposal and presentation, as well as homework/discussion questions -- will require the student to gather information to support their arguments from a variety of sources, both in and outside, of their required class reading. For example, in a class discussion on the problems of trans-border pollution (e.g. acid precipitation), the student may wish to look to studies sponsored by the governments of the United States and Canada, as well as those funded by American coal interests and utilities, in order to gain an appreciation of the difficulty in gathering authoritative ecological data, and thus an understanding of the problems of developing environmental ethical norms.

Student Evaluations: Evaluation of the quality of class discussion.,position paper and presentation, will in part be based upon the identification, and use, of quality scholarly sources from a variety of disciplines.

2. Demonstrate capabilities for critical thinking, reasoning and analyzing

Emphasis: Significant

Course Content: This objective is addressed specifically in the course content. The discipline of environmental ethics is concerned with the critical analysis of environmental problems, and the development of normative standards for proper actions within the environment. As such, the students will be using all manner of reasoning skills, from the deductive structure of arguments in their class presentations and position papers, to analysis of deductive, inductive and probabilistic methods used in ethical arguments, scientific arguments (such as risk assessment) and the arguments of their peers in class discussions.

Teaching Strategies: Weekly class discussions, initiated by sets of homework questions, will encourage the student to examine ecological problems and their proposed ethical and technological solutions, in a critical manner. It will be the stated purpose of such discussions to engage the entire class in a lively dialectic, which it is hoped will carry through into the lectures. Such activities will foster the development of sound argumentative techniques, from the construction and criticism of arguments, to the proper uses of supporting evidence.

Student Assignments: Class assignments -- the position paper, paper proposal and presentation, as well as homework/discussion questions -- will require the student to analyze and critique a variety of arguments, ethical as well as scientific, put forth by the assigned authors, the instructor and, most importantly, their peers. Such a Socratic approach of argument and counter-argument will only reinforce the practical value of meta-level studies such as ethics.

Student Evaluations: Evaluation of the quality of class discussion.,position paper and presentation, will based primarily upon the structure and quality of the reasoning employed in the construction of arguments and criticisms.

3. Demonstrate effective communication skills

Emphasis: Significant

Course Content: The communication between various groups involved in environmental disputes will be addressed tangentially insofar as the course content is concerned.

Teaching Strategies: Effective communication is essential in arguing for or against certain ethical norms. One of the main purposes of class discussion in this class is the development of effective verbal and written communication skills. Students will be evaluated, in part, based upon how effectively they communicate their arguments in class discussion, on the exams, and in the assigned position paper.

Student Assignments: Students will be encouraged, and ultimately expected, to communicate their ideas in a clear and concise fashion. It is for this reason that the position paper assignment contains a mandatory proposal assignment. The proposal will force the student to present preliminary arguments for the value of their particular project and the feasibility of their position on the issue (e.g., Thesis: Acid precipitation should be eliminated because of our ethical responsibility to the wildlife in affected areas.). In this way, they can begin to hone their communication skills early in the semester, learn from constructive criticism, and present a more clear and concise argument by semester's end in the actual position paper and class presentation. In addition, weekly class discussions will present a regular opportunity to practice the art of effective communication of complex ideas in a short time period. Such a process forces the student to focus on relevant specifics, the most difficult of all scholarly research skills.

Student Evaluations: Clarity and precision will be evaluated and amount to a significant fraction grades on all student assignments, written and oral.

4. Demonstrate an understanding of human experiences and the ability to relate them to the present

Emphasis: Significant

Course Content: One of the primary goals of this course is to put forth the argument that an understanding of the ethical problems which arise and have arisen with human intervention in the non-human environment is essential to understanding our role as residents of the planet earth as human beings, and as part of a larger, interconnected, ecosystem. Environmental problems have a long history, yet environmental ethics is a relatively new discipline. This course will attempt to find out why this is the case. Finally, the anthropocentrism which is often noted as a significant factor in environmental problems, particularly in the West, has a long history of its own, and thus ethical norms which seek to regulate human behavior in the environment must look to the social, cultural and intellectual history of this, and other related concepts.

Teaching Strategies: The lectures and discussions will stress philosophical concepts, augmented with the historical context which surrounds past and present environmental problems. The discipline of environmental ethics arose in a particular context, and this course will be sensitive to that context.

Student Assignments: Class assignments -- the position paper, paper proposal and presentation, as well as homework/discussion questions -- will require the student to gather information to support their arguments from a variety of sources, many of which will no doubt be historical in nature. Environmental problems develop through time, and a consciousness of the ethical issues which surround these problems develops in that same milieu.

Student Evaluations: Clearly, any evaluation of student work must take into account the student's sensitivity to historical issues

5. Demonstrate an understanding of various cultures and their interrelationships

Emphasis: Significant

Course Content: Questions of environmental ethics arise in an understanding of the interconnected

nature of cultures. More than one third of this course is devoted to an understanding of how different cultures view their relationship with, and their place in, the environment, and how that world view affects their determination of good and bad behavior in, and toward, the environment. This world view is affected by a variety of factors, including religion, economic structure, geography, and as some would argue, gender and race. No class in environmental ethics is complete without a thorough examination of these matters.

Teaching Strategies: In addition to the lectures, weekly class discussions will be used to allow the students to engage in role playing situations, encountering ethical dilemmas in the environment from a variety of perspectives. For example, the issue of rain forest depletion looks very different from the perspective of a millionaire rock star seeking to ban the farming of deforested lands, and that of a Brazilian farmer trying to support a family on that very soil. Such strategies are extremely effective in getting the student to realize the effect of "world view" on the formation of philosophical, and in this class, ethical, norms.

Student Assignments: Class assignments -- the position paper, paper proposal and presentation, as well as homework/discussion questions -- will be expected to show a critical sensitivity to cross- cultural issues. By "critical" I mean an evaluation of the cross-cultural implications of various ethical norms, not because it is often deemed to be fashionable, but because these implications must, as all other implications of ethical norms, be examined in the light of the critical reflection and scrutiny of any student of applied ethics. Pandering to intellectual fashion should not be tolerated, nor should elitist chauvinism of any kind.

Student Evaluations: Evaluation of the quality of class discussion, position paper and presentation, will based partially upon the cross-cultural implications of the assignment only insofar as there are cross-cultural implications.

6. Demonstrate the ability to integrate the breadth and diversity of knowledge and experience

Emphasis: Significant

Course Content: By its very nature, environmental ethics is an interdisciplinary study. In order to formulate standards of ethical behavior in the environment, historical, scientific, technical, theological, economic and, of course, philosophical, knowledge must be integrated. The delicate nature of this philosophical task is what makes the study of environmental ethics so essential to the contemporary curriculum. The aim of this course is to examine the kinds of ethical norms which emerge from such an amalgam of knowledge.

Teaching Strategies: Lectures and discussion will stress, and above all encourage, the integration of diverse knowledge. It will also be important to examine the process of integration itself, for such meta-level questions must be addressed in philosophical discussions at this level.

Student Assignments: Students will be encouraged, and ultimately expected, to draw from and eventually synthesize information from the range of disciplines mentioned above, and to justify their synthesis.

Student Evaluations: As part of the student's written and oral work, the quality of interdisciplinary integration will contribute to all grades in this class.

7. Demonstrate the to make informed, intelligent value decisions

Emphasis: Significant

Course Content: This course addresses the very question of what it means to make informed and intelligent value decisions. Such decisions will be addressed on the applied level (e.g., "Is it ethical to burn PCB wastes in sparsely populated areas.") and on the meta-level (e.g., "Do we who live today have an ethical obligation to future generations? For that matter, what is an ethical obligation?").

Teaching Strategies: Class discussions, and to a lesser extent the lectures, will be used to emphasize the nature and importance of informed value decisions. It is essential in a course of this nature to walk a fine line between discouraging the formation of value judgements based solely on intuition and possibly alienating the students by pointing out flaws in their intuitive arguments. Class discussion should never be used for a "TV talk show-type" opinion forum, where any one opinion is as good as any other. The discussions should be used to encourage the critical analysis of our ethical intuitions. It is in this way that we can build informed value judgements.

Student Assignments: Class assignments -- the position paper, paper proposal and presentation, as well as homework/discussion questions -- will require the student to gather information to support their arguments for or against certain value decisions, and thus address this objective directly.

Student Evaluations: Everyone is entitled to their ethical opinions, but all opinions will be graded on the extent to which they are well-supported arguments, that is, informed and intelligent value judgements.

8. Demonstrate the ability to make informed, sensitive aesthetic judgements

Emphasis: Some

Course Content: This objective is addressed tangentially. It is often noted that a goal of environmental ethics is the regulation of behavior in the environment so that its beauty may be preserved. It is also noted, quite to the contrary, that it is this grafting of human values (i.e., beauty) onto nature which often leads to environmental problems. The ability to make such aesthetic judgements will not be stressed, but their role in environmental ethics will be addressed.

Teaching Strategies: This issue will be addressed as needed in lectures and discussions.

Student Assignments: Unless a student chooses to examine aesthetics and ethics in the environment as a specific topic, aesthetics will be addressed only tangentially in student assignments.

Student Evaluations: Students will not be evaluated on the basis of this objective unless their position paper topic deals specifically with issues of an aesthetic nature.

9. Demonstrate the ability to function responsibly in one's natural, social and political environment

Emphasis: Significant

Course Content: This course addresses the very question of what it means to act responsibly by addressing the meta-question, "To what extent am I responsible for the present and future consequences of my actions, with respect to the environment?." Human actions affect the environment, and since the human beings also depend upon the environment for their survival, such ethical decisions often have social, political and economic consequences.

Teaching Strategies: Lectures and discussions will focus on the ethical question of what it really means to act responsibly in the environment.

Student Assignments: The position paper will address this aim directly. Students will have to take an ethical stand on a particular environmental issue -- the incineration of PCB wastes, use of nuclear power, etc. The question put to them is essentially, "What constitutes responsible behavior in your case?" Do we incinerate PCB wastes, and if not, what do we do with them? What are the ethical dimensions of this behavior? Finally, they must answer the question, "When you speak of responsibility, to whom and what are you responsible?" Does ethical responsibility in the environment extend to every living creature, future generation, all human beings? If so, why? This aim lies at the heart of any ethics class, and is especially important that the student assignments reflect that in this class.

Student Evaluations: This is really the heart of the content of student work in this class. Evaluations will be based on the quality of their arguments justifying the norms by which "responsibility" is defined. In short, students will be evaluated on the extent to which they understand the consequences, natural social and political, of ethical decisions.

IX. Background: The instructor for this course should have a strong background in philosophy and an understanding of the complexities of environmental issues from scientific or technical, and socio-economic perspectives. Experience in either ethics or environmental science/technology is desirable.

X. Class Size: Since this class will function at optimal pedagogical efficiency by combining discussion and "open" lectures, the maximum class size should be 25.

Upper-level interdisciplinary classes are expected to integrate material from two or more of the "Perspectives" of the University Studies curriculum (see Section II). It became apparent to me that interactive multimedia, with its ability to represent connections between broadly diverse subject areas, would be an ideal tool to achieve the goals of this class. In addition, I faced the problem that, in spite of my attempts to limit the class size to less than 25 that there are presently not enough senior seminars to satisfy the demands of the student population, resulting in enrollments more often at 35 or higher. This is clearly not the optimal size for a seminar. Asynchronous techniques such as campus computer Bulletin Boards (called "conferences" on our campus) were initiated in order to facilitate interaction between students outside of class, thus carrying on a detail;ed kind of discussion of philosophical and scientific issues which, due to the unwieldy logistics of the class size, would be impossible otherwise. In the sections that follow, each computer-assisted technique serves the objectives of the class as described above, keeping in mind that course content always drives computer application, not vice versa.

3.0 Asynchronous techniques

In a culture where more and more college student are of the non-traditional variety, i.e. non-residential, part-time, adult learners, etc., instructors must become the ones who adapt in classroom situations, not the students. In an October 1995 study, a Drexel University reported that asynchronous teaching and learning techniques offered a viable solution to many of the problems faced in contemporary humanities seminars. They list the following as conclusions:

1. Students assume ownership of the discussion and are willing to interact with each other and question each other, participating in the online discussion 3-6 times per week;
2. Students were more willing to initiate their own studies (e.g. term paper topics) when discussing them with their peers online;
3. The relative anonymity of electronic communication allowed often shy students to "speak up," becoming, as it were, full participants in the class discussion. (Andriole, et al., 1995)

The passages below are but two examples taken from the online discussion from a recent version of my environmental ethics class.

Figure 1: The menu for "conf envethiç," Fall 1996

MUSIC/SP Conferencing Facility. Subject: Discussion of environmental ethics

Show option: ALL (F5 flips option between NEW and ALL)
S Topic Last Changed Description
- -------- ---------- ----------
_ INTRO 1996/11/06 14:58 Welcome to Envethic
_ THEORY 1996/09/10 22:06 Discussion of various ethical theories
_ LOVCANAL 1996/09/10 22:07 Discussion of the Love Canal incident

_ GLOBWARM 1996/11/07 14:05 Global warming
_ WORLDVIE 1996/11/06 14:33 Discussion of western and ecological world views
_ SUSTDEV 1996/11/05 21:50 Discussion of sustainable development
_ ECOFEM 1996/11/04 14:09 Discussion of ecofeminism

|---> Selection options: V: View A: Append

Figure 2: Sample postings to "conf envethic"

"In Chapter 6, Sustainable Development and Deep Ecology, of the Engel & Engel book, it talked about humans and their misuse of the land. Am I understanding correctly that it shows humans as somewhat narrow-minded, in reference to "The Population Factor" at the bottom of page 91? It says that we have the priority over other inhabitants of Earth and that nature is only necessary if it can somehow benefit us. Do the authors mean humanity in general or the richer nations, because on page 93, it says that a "simple conclusion is that sustainable development of populations is a subject of importance in every country, and the greatest responsibility rests with the richest." Just curious as to what someone else might have gotten out of it..."

"I would like to dirrect this comment to XXXXXXXXXX, who commented on the chapter from the Engel & Engel book. I believe the author is in fact referrring to all human beings as being suppressive and not just rich nations. The author is saying that non-humans are only useful forhuman consumption. I would not venture as far as saying he agrees withthis belief. The author instead is explaining the views that society has lived by historically. I would also like to comment on the use of the word "carring capacity." I think it is interesting to see how society has defined this term. Society uses' the term to mean the amount of people the environment can support with out distrucing. In fact this term should include non-humans as well. The exact carrying capactity depends on both humans and non-humans."

Generally speaking, most students have neither the time nor expertise to formulate such detailed discussion while in class. This is not a derogatory remark in any way; rather, it is a simple statement of fact with respect to anyone's ability to digest new and difficult material and then comment upon it. In order to maintain the quality of the online discussion and in order to keep it "on topic," it is essential for the instructor to act as an online mentor. This means that the instructor does not actively participate in the online discussion, but rather posts the occasional provocative question to maintain the relevance of the discussion, acting, as it were, as the "invisible hand." Based upon the quality of the online discussions I have followed, and the subsequent translation of that discussion into term papers and exams, I must concur with the conclusion of the Drexel study. "Based on this study, it appears that the model of the mentored-seminar, an educational model that dates back to Socrates and Plato, has enormous flexibility and educational integrity in its online form." (Andriole, et al., p. 105)

4.0 Off-the-shelf multimedia and the 1992 Rio Summit

A casual glance at the course description above reveals the centrality of the interplay between scientific and policy-related issues in this class. I have incorporated an interactive policy simulation called "Balance of the Planet" (Copyright 1990, Chris Crawford) in an attempt to simulate the 1992 United Nations Earth Summit. This commercially available game is unique in that it allows the user to alter any of the hundreds of algebraic equations which determine the outcome. For example, when students are

faced with the problem of starvation, they are faced with a set of interrelated parameters such as the overall world population and the value of an individual's life. The students quickly arrive at the realization that "Balance of the Planet" is a model, no different, in principle, from any other scientific theory in that, qua model, it reflects the biases of the model builder. In this sense, the classroom exercise becomes an exercise in valuing, as students are faced with scientific parameters which must be estimated, and moral parameters which on the service do not lend themselves to qualitative analysis but, within the confines of a computer model, must be given numerical representation. Discussion of these issues is essentially dialectical, with the computer sitting in the background. The simulation aids the dialectical process, rather than replacing it. The figures below offer some glimpses of "Balance of the Planet."

Figure 3: Balance of the Planet

Figure 4: Balance of the Planet Results Screen

Figure 5: Causes and Effects of Starvation in Balance of the Planet

Figure 6: Formula Manipulation in Balance of the Planet

Each student is assigned a constituency to represent in a parliamentary role playing exercise pitting the interests of non-governmental organizations such as Greenpeace with governments such as Russia and Germany and industrial interests. IN this way, the classroom computer is more than a glorified television set -- it facilitates the understanding that ecological issues are multidimensional and complex (see, for example, Sterling, 1990).

5.0 Authorware and beyond

One of the consistently frustrating aspects of integrating computers into any class is the overall lack of availability of university-level software beyond business and science curricula. Macromedia's "Authorware" line of authoring platforms offers instructors a simple, object-oriented development platform. At the time of this writing, I am currently developing a tutorial for environmental ethics with the academic version of Authorware for Macintosh.

6.0 Conclusions

In order to be beneficial across the curriculum, applied ethics instructors must create an interactive learning environment. Computer assisted techniques can be useful in this sense. Allowing the students to alter parameters in policy simulators makes such classes ideal for fostering critical thinking. Thus, in spite of the obstacles which face contemporary humanities instructors, it is possible to maintain the essentially Socratic nature of such classes by adopting relatively simple computer-assisted approaches.

[TOP]

The Implication of Digital Video Interaction (DVI) Technology in Multimedia Post-Production Techniques

Temba C. Bassoppo-Moyo, Ph.D.

- Abstract
- Introduction
- A Brief History of DVI
- An All Digital Approach
- CD-ROM, CD-I, and DVI
- The Power of DVI
- DVI and Video Producers
- DVI's Implications to Film and Video Production
- Foregrounds and Backgrounds
- Use of DVI in Developing Countries
- Conclusion
- Bibliography

Abstract

This study explores the power of Digital Video Interaction (DVI) technology as it pertains to its ability to combine multimedia tools to form a single communication engine. The study looks at what DVI is, its historical origins, its importance, how it works as well as where its impact is likely to be felt in the next century. For what may be a very rare occassion, this study explores the potential of DVI in developing countries in terms of new dimensions in personal as well as organizational computing.

Introduction

The advent of the computer and other twenty-first century technologies has dramatically altered the rules by which software producers and engineers do business in the fields of education. A lot of research concerning the use of multi-media systems in the design, development, and implementation of Hypermedia/Hypertext learning environments continues to be carried out throughout the world.

Thanks to an ingenious marriage of digital technologies known as digital video interactive (DVI), learners can go on expeditions in the comfort of their living rooms. The DVI technology combines motion video, still pictures, multitrack audio, and computer graphics in a single integrated environment controlled by a personal computer which can either be a Macintosh or Windows driven DOS compatible (Bainbridge, 1995; Glass, 1989; Hoffert, 1992; Luther, 1989; Okamura & Mukaida, 1996). Implemented by boards and chips manufactured in quantity by Intel, DVI provides all the facilities necessary to produce truly exciting and colorful interactive-video presentations. The latest DVI technology incorporates full stereo sound and high resolution three dimensional graphics.

A Brief History of DVI

What is digital video interaction (DVI)? DVI was conceived at RCA Laboratories in the early 1980's (Glass, 1989; Dixon, 1989; Chen, 1991). This followed a time when RCA had been working on schemes

to make its LaserVision analog videodisk system interactive, with unsatisfying results. The RCA research and development team suggested an all digital approach to the unsuccessful analog videodisk interactive system which had been the benchmark to DVI.

The effort continued for six years, while the research team weathered numerous budget cuts and changes in management at RCA (Glass, 1989). In the meantime, RCA dropped out of the video disk and home computer manufacturing businesses and was acquired by General Electric. Despite a warm reception at the 1987 CD-ROM conference, DVI was not originally viewed as a promising technological advancement (Dixon, 1989). In addition, GE's strategic plans did not include this technology as part of the company's future investment strategies. As a result, GE donated the Sarnoff Research Center which had been primarily responsible for the DVI research to SR1 International while still retaining control of the technology. Eventually in October 1988, GE sold the DVI technology to Intel Corporation, the makers of semiconductors, computer chips, and circuit boards for a reported $25 million, an action that surprised most industry analysts (Davis, 1981).

The foresight and vision of Intel, coupled with their dominance in the area of semiconductors and microprocessors has paid off since they acquired this technology in that the basic "plain vanilla" personal computer now sold has a built-in multi-media capability (Davis, 1989). The new network systems coupled with videophones and videoconferencing facilities are three telecommunications sectors that benefit from DVI's compression and decompression techniques (Hoffert, 1992). The most common types of multi-media applications that are appearing on the market place are applying this technology in the areas of education, training and development (Adams, 1995; Chen, 1991). Education and training have been the first large-scale universally understood multi-media submarkets which have successfully attempted to utilize the compressed full-motion, full-screen digital video attributes of DVI.

An all digital approach

Already, a few DVI systems provide interactive audio, video, and computer graphics. For instance, popular arcade games such as Dungeons and Dragons let you move about dungeons, fighting monsters in a quest for some "prize" which may include a beautiful princess or some popular pursuit among young players. DVI has also become a very popular platform for training in government and corporate institutions (Chen, 1991; Barron &Orwig, 1995; Plowman &Chambers, 1994). For example, the U.S. Army uses a system called EIDS (Electronic Integrated Digital Systems) for interactive training that simulates aerial and ground combat environments (Kuhn, 1991).

The system has also become very popular in training learners with special disabilities or handicaps in educational and industrial settings (Crowell, 1988; Okamura &Mukaida, 1996; Kuhn, 1991). A key goal of DVI is to eliminate the expense, complexity, and awkwardness of a part - analog / part-digital system by storing and processing everything as digital data. DVI uses a single storage device in a single set of chips to produce live action video, synthetic video, and audio, all under the direct control of a personal computer. The result is a system that is far more interactive and sheer fun to use than anything that has been produced on the market up to now.

CD-ROM, CD-I, and DVI

There are variations of the multi-media interactive systems on the market these days, and they differ considerably in both delivery and punch. The most common comparisons with DVI are drawn between Compact Disk Read Only Memory (CD-ROM) and Compact Disk Interactive (CD-I) (Barron &Orwig, 1995; Cates; 1993; Chen, 1991; Davis, 1989; Lippman &Butera, 1989).

What are the differences between CD-ROM, compact disc interactive, and digital video interactive? CD-ROM as defined by Phillips/Sony Yellow Book and international Organization for Standardization, is merely a way of encoding data files on CD-ROM disc (Corporate Document, 1989). It does not say anything about what is in the files or how they are used. In the meantime CD-I, is defined as a specification for a complete hardware/software product that includes a CD-ROM player, a Motorola 68000-family Central Processing Unit (CPU) and special audio and video processing hardware (Glass, 1989; Luther, 1989; Plowman &Chambers, 1994). Intended for the consumer market, it is designed for

price- sensitive applications; keyboards and read-write storage media are options. CD-I has a wide range of capabilities, including CD quality audio, but it cannot display continuous full- screen, full motion video, and it cannot run on hardware that doesn't precisely conform to the specification. DVI is more generalized technology that does not require specific hardware other than DVI chip set. Unlike CD-I, it is suited for use with forms of mass storage other than CD's, WORM (Write Once Read Many times) disk and magneto-optical disks. Also, it can work as a peripheral of many different kinds of computers. DVI can display full screen, full- motion video, and the internal graphics CPU-as well as the host CPU. It can also be programmed to execute new special effects and data compression or decompression algorithms.

Both CD-I and CD-ROM have always been promulgated primarily as home-oriented technologies (Corporate Document, 1989, Davis, 1989). Developed by Philips GL and introduced jointly by Sony and Philips in 1986, the CD-I standard specifies a 68000 CPU-based, closed system box designed to connect a home television or some other monitor, much the same way a video cassette recorder functions with television (Corporate Document, 1989). CD-ROM incorporates audio-visual transmission for home entertainment and personalized instruction.

The Power of DVI

DVI can randomly access still images which are of higher quality than those generated via videodisk (Cates, 1993; Corporate Document, 1989; Morris, 1987; Okamura &Mukaida, 1996). Depending on the screen size and the degree of digital compression or how much significant data you are willing to forgo for the sake of saving storage space, tens of thousands of color still pictures can be stored on a 31/2 inch CD-ROM disk. Because the decision on compression are made by the user on a picture to picture basis, there is no limitation on how much material can be stored on a single disk. Compression ratios vary from user to user, but on average, a 10:1 compression ratio is considered sufficient to store an average color picture. In addition, a 31/2 inch disk can store 54,000 random access picture frames. Taking into account the fact that a CD-ROM disc can hold a storage capacity of 550,000,000 bytes (conveniently expressed as 550 megabytes of storage space), the strength in DVI becomes its ability to store large amounts of data. Its additional strength is also its capability of storing in excess of 250,000 pages of text on a 31/inch CD-ROM (Glass, 1989; Luther, 1989).

In motion video, the magic figure is 72 minutes of motion picture video at full frame or 144 minutes at half frame and so on (Cates, 1993; Glass, 1989). DVI can also provide 40 hours of monophonic record and playback or 20 hours of stereophonic sound. At its best, DVI practically provides stereo CD audio. The fact that DVI can provide a combination of 250,000 pages of textual data, 72 minutes of motion video, 54,000 random access frames, 40 hours of audio and high resolution animated graphics, makes this a very powerful technology for multi-media producers and instructional designers and technology specialists.

DVI and Video Producers

Video producers who have been keeping their eyes and ears on the industry know about the 3 and 1/2, 5 and 12 inch digital video interactive disks (DVIs). They have been around for the past 15 years as specialized bits of video used in training, education, promotion trailers, points of sale and other applications (Morris, 1987). However, because of the sophistication as well as the expense involved in duplication, there has never been a huge amount of video produced using these special video vehicles. Until the recent introduction of peripherals that can read as well as record Compact Discs (CD's), linear magnetic recording facilities have often been more cost beneficial in the production of corporate as well as educational videos. In production houses and studios, 1/2 inch and 1 inch video cassettes are usually cranked out in sufficient numbers to be distributed in a short period of time. On the other hand, DVI productions, because of their technological demands, have not yet hit the market hard enough to make video producers depend on them for their day to day operations.

DVI's Implications to Film and Video Production

Video Compression: The first and most exciting component of DVI is advanced video data

compression. Extremely good compression, especially of video, is necessary because an uncompressed video image takes up large amounts of memory. DVI addresses this problem by providing extremely efficient compression and fast decompression of video information. Since the greater part of a video image doesn't change from frame to frame, only the differences between successive frames are recorded. Special hardware to handle compression mechanisms like a CLUT (Color Look Up Table) and chrominance subsampling is built into the DVI chip set. Additional propriety techniques pack make the system even more versatile (Glass, 1989; Luther, 1989).

The compression algorithms take into account the fact that only decompression must be done in real time, shifting as much of the computational burden as possible to the device that compresses the video(Glass, 1989; Dixon, 1989). The final result is more than an hour of full screen motion video and multichannels audio on a single CD-ROM disc all of which can be played back in real time.

Currently, the practical minimum size of a compressed video frame is about 15k bytes (Luther, 1989). More compressions usually introduce undesirable artifacts. However, because the DVI hardware is easily reprogrammed, none of the compressions algorithms are fixed in stone. This flexibility is letting DVI grow as the state of the art advances, while allowing new systems to be downward compatible.

The DVI hardware can also compress and decompress still images with compression ratios of up to 25-to-1 (Glass, 1989; Okamura &Mukaida, 1996). Exact reproductions of detailed graphics and illustrations can be done at ratios between 2-to-1 and 3-to-1. For film and video producers, the digital nature of DVI provides versatility that has never been dreamed of nor fully developed to its capacity. DVI can produce resolutions ranging from VHS quality at 30 frames per second, to an eye-popping 1,000- pixel- per line HDTV (High Definition Television) quality when played at much slower frame rates. This is equivalent to viewing a high resolution theatrical film production on your televisions screen. The system can be made to vacillate from VHS to HDTV at the flick of its own internal software.

Audio compression: The compression of audio information poses different, but equally challenging problems. Audio doesn't exhibit as much regularity as video, so it's not as easy to interpolate future wave forms from earlier ones (Glass, 1989; Luther, 1989). Also, audio must be contiguous. Most of us are used to video sequences that jump from take to take, but discontinuity in an audio signal can be jarring.

DVI provides audio compression via an ADPCM (for adaptive differential pulse code modulation) algorithm and uses special buffering techniques to prevent discontinuities in the sound, even during the long step times of CD-ROM heads (Glass, 1989; Luskin, 1993). Typically, the compressed audio will take from 4k to 16k bytes per second (more if there are more tracks).

The audio accompanying the video also can be whatever the user desires. When the system is purring along at 30 fps, the accompanying audio is FM-stereo quality. If the user programs the record-playback system and indicates that they are going to dispense with the video or some other visual effect, then the audio quality can become as good as regular audio CD (Glass, 1989; Luther, 1989). At the other extreme, the user can program the system so that it plays a long audio-only recording that can dispense up to 40 hours of commentary quality on one disc side. In such a length of time, one can look at perhaps a series of photomated pictures, slides, or graphics which are accompanied with audio commentary, music and sound effects. This process is enhanced by the fact that the board that does all the DVI manipulations, generally performs better, faster and is more versatile than any graphics board on the market today.

For the film or video producer, DVI development is further good news in that the system's digital versatility makes it possible to recombine video footage already on the disc into new interactive productions (Luskin, 1993). For a film producer who undertakes projects that require multiple copies but with edited content and special effects on each duplicate, DVI allows them the possibility of making only one disc at half the cost, then rearranging its contents via software to produce subsequent duplicates. DVI technology's ability to rearrange video already on disc (i.e., essentially performing edits on cuts, mixes, dissolves, special effects, etc. already scripted onto the disc), does limit itself to simple rearrangements that have been attempted on the 3 and 1/2, 5, and 12-inch discs. The system enables the producer to pull video from various parts of the disc and combine them on the screen, simultaneously

(Luther, 1989).

Because of the additional capabilities of peripherals that can generate special audio-visual effects, the system's editorial functions are becoming limitless. For example, an elementary calculus course could demonstrate simple differentiation and integration using abstract symbols and graphics. An advanced course from the same disc could combine these elementary contents with advanced concepts, such as multiple integration, and show them simultaneously on the same screen-even though they would have been stored on the disc at separate points. In general, partial-screen motion video cuts can be stored at separate points on the disc and recombined under software orders to form either an elementary or advanced exposition. This amounts to editing an already-pressed disc. It's just one of the advantages that has made DVI the door-opener that has long been needed in the interactive disc market.

Synthetic Video: Along with the ability to reproduce compressed video sequences, DVI multimedia engines create computer-generated images in real time (Barron &Orwig, 1996). The hardware supports both bit-mapped graphics and "structured" graphics, and there are facilities for bit mapped (and, potentially, stroked) text fronts. Further, DVI uses special hardware to perform the warp algorithm, which very quickly maps a pattern or texture onto a simulated two dimensional or three dimensional surface. The sample application called Design and Decorate (DD) demonstrates this feature by, for example, allowing you to "reupholster" sofas and chairs with different fabric patterns in a fraction of a second, then arrange them in a simulated room to see how they will look in real life. The DVI hardware and software generate realistic shadows and textures, and they let you change vantage points almost instantly.

When the RCA research team began developing DVI, they started with their forte, video, instead of computer graphics (Davis, 1989). The system now, however, combines both video and graphics. The result is not only excellent compressed video, but also a graphics approach that sometimes leaves a viewer not able to tell if they are seeing graphics or video. DVI technology is now widely used in combination with such techniques as Stop Motion Animation (SMA), Computer Generated Imagery (CGI) and other combinations of three dimensional animation. The latest Hollywood blockbuster movies almost invariably employ this technology in one way or another. Toy Store and the Terminator series are just the latest illustrations of how the technology is being pushed to its limit.

DVI can do wonders with a computer-generated wire frame of a model interior of a house. This is a technique very familiar in computer aided design (CAD). Adding colors to different fixtures, walls, rooms and furniture has always been done using paint programs such as Adobe Illustrator, Photoshop, etc. and other paint software programs. But DVI can dramatically alter this same pseudo-environment, by adding real objects such as kitchen appliances, home entertainment centers, ceiling fans and grass landscapes that appear through the windows. DVI facilities can also create computer-generated images in real time. The hardware supports both bit-mapped graphics and "structured" graphics, and there are facilities for bit mapped text fonts (Chen, 1991; Davis, 1989). What happens is that the DVI image is transformed into more like a photograph than a graphics illustration. In a way, it is a photograph. What DVI has does is similar to " warping " sample photographs of real fixtures, furniture, grass etc. until they fit the surfaces of the wire frames of the internal decor of the house.

The result is graphics displays that look extremely real. But that's just the first trick DVI provides for this type of multi-media production. Because a computer can recalculate a wire frame and change the viewpoint, the viewer can look at "Pseudohouse interior" from different angles. Further, because DVI also can recalculate all the "warped" photographs to fit them on to the new view, the realistic entertainment center and green landscape, for example, can be reshaped to fit the new view point. In addition to all this, one can change their viewpoint in any part of the interior of the house-at angles that would not have appeared if they were trying to do this with ordinary still or motion picture photography (Plowman &Chambers, 1994). This technique enables DVI to furnish the viewer with a completely reasonable motion synthesis of what might be inside the interior of the whole house. In short, with the appropriate keystroke and joystick maneuver, the viewer is able to tour the interior of the whole house without leaving their workstation. DVI can also redo images so quickly that it can change wire frames, fixtures, and the whole interior and exterior decor on a key stroke.

Foregrounds and backgrounds

Another DVI visual illusion resembles cell animation. Very popular in the production of animated sequences or feature films such as Bugs Bunny, The Lion King and Tom and Jerry, this technique allows a background scene or scenes to be recorded to disc (one frame space is all that is required), and that background video can then become a background for many different foregrounds (Cates, 1993; Bainbridge, 1995). Not only is such an arrangement economical on disc geography or space, but in some cases a foreground can be a sparse recording whose "flight path" can be varied at each showing by a few software control bits.

And if a static background is not enough, several contiguous background scenes can be invisibly seamed together. The system can perform the camera operations of panning left or right, tilting up or down, as required to give the illusion of following foreground motion over a larger background. With a joystick, the user could look around anywhere in the entire 360 degree horizon during playback.

Use of DVI in Developing Countries

During the past few years, DVI has become a component of a much larger training and development environment referred to as Electronic Performance Support Systems (EPSS). EPSS represents a combination of subsystems that include the Internet, the World Wide Web (WWW) and a host of other interactive multimedia distance learning environments. The scarcity of training facilities in the areas of education, commerce, and in government institutions make DVI/EPSS a worthwhile investment in developing countries. Under controlled circumstances, the system can be adapted to be a stand alone instructional environment that is designed to be domain specific when it comes to delivery as we'l as evaluation and follow-up.

There is growing and compelling evidence that reveals that DVI, as a multimedia engine, has been found to be effective and efficient in many educational and training situations. DVI could prove its usefulness as an alternative to the increasingly scarce live instructors and trainers of trainers at teachers' colleges as well as in commercial and industrial settings. A well-designed DVI expert system would allow most organizations to augment the present conventional methods being used to human resource development. Again, when one takes a cursory look at the fundamental problems of education in Africa as a whole, it is clear that they emanate primarily from the shortage of books, reference manuals, basic instructional literature and appropriate technology.

Conclusion

There are positive as well as negative implications of DVI to multi-media producers. For example, in creating a domain specific learning environment, it seems that the system is so clever that the only thing one has to do is take 10 frames of say a given scene, 25 frames of another, and so on, and DVI will grind out a complete panorama of what you want. This is not the case. For DVI to be used effectively and efficiently, it requires lots of videographers and cinematographers to shoot lots and lots of video, film, still pictures, and graphics. The stills and graphics would have to be photomated to create movement, and where necessary, drama and illusion. This takes a lot of work if the production is to be done right.

It is therefore safe to say in spite of its cleverness and digital versatility, DVI can no way dispense of a good videographer except for those special occasions in education and training when DVI's cleverness and versatility will dispense of passive or elective viewing for a more interactive experience. There is therefore little doubt that DVI is an outstanding technology with a lot of potential in the developing world where, in some cases, experts in education and training tend to be few and far between.

As societies move into the information age, changes are being made in the educational process to ensure that students will have the skills they need in the workplace. By keeping abreast with technological changes in the design, development, and implementation of instructional software, instructional technology specialists and experts can play a key role in restructuring the educational system.

Bibliography

Adams, D. (1995). CD-I and Training: A perfect fit? Performance and Instruction, 34(6), 28-33.

Bainbridge, S.V. (1995). You can't teach soft skills on a computer.....can you?. Journal of Instructional Delivery Systems, 9(4), 5-12.

Barron, A. E.&Orwig, G.W. (1995). New technologies for education: A beginner's guide. 2nd Ed. Libraries Unlimited, Inc. Englewood, CO.

Cates, W.M. (1993). Instructional technology: New optical technologies. Clearing House, 66(6), 324-325.

Chen, C. (1991). CD-I and full motion video. Microcomputers for Information Management, 8(1), 53-57.

Chen, C. (1991). The coming of digital visual information age: Implications for information access. Microcomputers for Information Management, 8(4), 255-275.

Davis, D. (1989). Intel and IBM share their multimedia vision. Electronic Business, 13, 2-10.

Dixon, D.F. (1989). Life before the chips: Simulating video digital interactive. Communication ACM 32, 7, 844-861.

Glass, L.B. (1989). Hands on under the hood: Digital video interactive. Byte Magazine, 5, 17-23.

Hoffert, B. (1992). Books into bytes. Library Journal, 117(14), 1301-35.

Kuhn, A.D. (1991). Quo vadimus: The 21st century and multimedia. NASA Office of External Relations, Defense, and Intergovernmental Relations Division. NASA Update: State and Local Newsletter 5, 1, 1-15.

Lippman, A. &Butera, W. (1989). Coding image sequences for interactive retrieval. Communication ACM 32, 32(7), 852-860.

Luskin, B.J. (1993). CD-I: From boob tube to teacher's assistant: The birth of Smart TV. Journal of Instructional Delivery Systems, 7(1), 3-5.

Luther, A. (1989). Digital video in the P.C. environment. McGraw-Hill, N.Y.

Morris, S.K. (1987). Digital video interactive: A new integrated format for multimedia information. Microcomputers for Information Management, 4(4), 249-261.

Okamura, N.H. &Mukaida, L.V. (1996). Public service telecommunications: PEACESAT. Education at a Distance, 10(1), 21-22.

Plowman, L. &Chambers, P. (1994). Working with the new generation of interactive media technologies in schools: CD-I and CDTV. British Journal of Educational Technology, 25(2), 125-134.

_____(1989). An introduction to CD-ROM XA. Phillips, Microsoft, and Sony. Microsoft Corporation, Redmond, WA.

[TOP]

An Online Adventure With BCReading and Wolftrip

Eric F. Luce

- Abstract
- The Promise and the Predicament
- Differentiated Professional Performance Appraisal and Professional Development
- WolfTrip
- Transformation or Just Another Trend
- References

Abstract

This case study of electronic correspondence and interactions will share some things that seemed "to work" and some things that seemed not to be considered as "work" when a middle school remedial reading class went "online" with a university based professor of curriculum and instruction. The middle school students (and their teacher) became quite interested in this activity. Moreover, these students were reading and writing even though their reason for being in remedial reading, instead of in foreign language class, was that they "couldn't read." Their tested reading levels were far below grade level.

This report will illustrate challenges and opportunities that arise when new technologies are used for teaching reading and writing. The case presented will also illustrate one way that technology was allowed to play a role in faculty development and training. If it were not for the existence of a differentiated faculty development and professional performance appraisal system for the teachers in the middle school setting neither the teacher nor the class would likely have gone "online." Moreover, without technical assistance from one of the students in the class (who was a hacker), this online adventure would never have gotten off the drawing board. This presentation will describe a way that was found to address questions that often arise over who will train teachers and how time can be found for teachers to learn to use technology to support their teaching and their students' learning.

The Promise and the Predicament

Tremendous expectations are held for the transformation of culture and society by technology. Pervasive is the belief that computers will be where work gets done in the future and that computer users will be the processors of information that will be created, learned and communicated. (Winik, 1997)

Instructional technology it is believed will transform schooling and learning. A decade ago, computer literacy for many teachers might have meant having access to computers in school settings and knowing how to turn them on and off. Now, the rush is on to have internet access in all classrooms. In many schools, computers were plunked down in classrooms and this was called access. A computer in every classroom was a goal. Now, dedicated phone lines with modems or networked systems represent access while many classrooms have no telephones if only for school security and safety uses.

Many arguments are martialled in favor of using technology in schools Two of the most common are that this will better prepare students for the world of work and motivate students to learn. While these are worthy objectives they do not readily evoke ways that technology will or can transform instruction, nor do they provide clues as to how or whether technology can add instructional value. It is easier to learn about new technologies, than it is to learn how to teach making use of new technologies so that

instructional value is added.

What are the realities of technology in education? One reality is that too many overhead projectors sit on shelves around the country because of burned out bulbs that no one knows how to replace. Another is that while questing for the silicon classroom, school districts are rushing to spend billions of dollars on computers and it is not clear that they really know what to do with them. Until teachers are as comfortable with computers as they are with blackboards, or there may be a lot of money wasted. (Kaplan and Rogers, 1996)

The larger problems related to classroom computing have to do with how to make the best use of computers and, more fundamentally, what students are to learn with and about them. Computer literacy may not necessarily result in more traditional literacy. Navigating the net, hunting and gathering, is not the same thing as knowing how to organize and effectively present information. Desktop publishing does not necessarily result in better writing. (Kaplan and Rogers)

Time is also a problem. Students may have more time than teachers to learn about technology if they have parents who can keep them up to date supplied with the latest hardware and software and if they have an interest in it. Teachers must work from "bell to bell" and have responsibilities outside of school as adults on limited budgets of time and money at home. Staff training in schools for learning new technologies is rarely available in ways that are common in the world of business. Putting the work of schooling on the back burner while teachers are tutored on technology is not widely considered to be an option. (Robinette, 1996)

Daring to put technology to use is risky behavior for teachers. Available technology may be unreliable, or out of date. Students may know more about computing than their teachers. Success in integrating technology in the processes of teaching and learning is hard to measure and quantify. If it is fun to use computers in school, will it also count as work? Teachers must wonder whether fun and fundamentals can be combined in an age of accountability measured by student performance on standardized tests.

It takes time to learn how to use different technologies and to integrate them into instructional activities. What does that learning curve look like? Is it a pretty sight? Will it be considered to be teaching which results in learning at all if such efforts are not immediately recognized as being successful? Until teachers and teacher educators are comfortable with new technologies, it may be unlikely that there will be many gains for students or improvements in schooling which result from access to computers or the internet. Also, who will teach the teachers and the teacher educators how to use new technologies to support teaching and learning? Are they largely on their own to sink or swim with whatever technology is available to them?

Differentiated Professional Performance Appraisal and Professional Development

This case study of electronic correspondence and interactions will share some things that seemed "to work" and some things that seemed not to be considered as "work" when a middle school remedial reading class went "online" with a university based professor of curriculum and instruction. The middle school students (and their teacher) became quite interested in this activity. Moreover, these students were reading and writing even though their reason for being in remedial reading, instead of in foreign language class, was that they "couldn't read." Their tested reading levels were far below grade level. It will also illustrate challenges and opportunities that arise when new technologies are used for teaching reading and writing.

One solution to the problem of supporting the professional development of teachers who seek to learn to use new technologies to support their work with students might involve the adoption of a differentiated professional performance model such as that being tried in the Lower Merion School District in eastern Pennsylvania. In Lower Merion where the professional staff is highly experienced and mature, it is possible for teachers to propose a professional development plan as an alternative to more traditional forms of professional performance appraisal, such as the oft-dreaded, but obligatory programs of formal classroom observation by administrators and supervisors with which teachers are so familiar. While this may not solve all problems related to the provision of time and training to support the integration of new

technologies into teaching and learning activities, a differentiated professional performance plan can legitimize teacher experimentation, inquiry and research in uncharted territories, such as the internet, which seem to offer so much educational promise.

One middle school reading teacher in the Lower Merion School District reported on her experience this way:

What a wonderful journey! When it took two months to get an internet account I was concerned, but it has been informative educational, and fun!
The reading teacher had to start her journey by reading, of course! **Kidnet: The Kid's Guide to Surfing Through Cyberspace** by Debra and Brad Schlepp was a great way to begin. The book is designed for children ages 9-13 and is filled with information about getting online and describing the sites that would be of interest to this age group. It also spoke of what to look out for and some etiquette for online behavior. I couldn't wait to try out some of the sites only to find that I couldn't figure out what to do. So on to the next book! Internet for Kids! A Beginner's Guide to Surfing the Net by Ted Pedersen and Francis Moss was just what I needed. I went with Cybersarge through the Cyberspace Academy and felt somewhat better about surfing the net. The book is written for middle school age kids and is a very clear description of how to surf and what the rules are in cyberspace. If I could understand, it must be clearly written!
What really got me moving was one of my students, Jon Wolfe. He was very excited to see that we had America On Line in the class and taught me much about it. For Jon the whole thing was so simple that he couldn't believe I could be wary. He sat me down and gave me some hands on instruction that was very helpful. From then, he began writing to my husband online and then his whole class was corresponding with him. From there, Eric's graduate level Secondary Education Curriculum class was writing to the class. It was an interesting experience for all of us. The kids did tire of it but the experience was good. They couldn't wait to read their messages and the concern over their grammar and spelling was amazing! Classroom management was difficult, who would get on first and so on. . .

The story that follows illustrates how email was integrated into the curriculum and activities of a seventh grade remedial reading class. This was an unanticipated outcome that came about as a reading teacher worked through her professional performance appraisal project. The work outlined in the original approved proposal was performed as well. That plan had been for the teacher to first learn how to logon to and navigate the internet in order to identify new ways that English as a Second Language (ESL) students might be better supported in the school. From the teacher's perspective, the results from that part of the project were somewhat disappointing.

From: WolfTrip
Subj: School
To: EFLuce
Dear Dr. Luce
I am Jon from you wifes class I am at home now my screen name is Wolftrip and I just wanted to say hi because I got borred. Talk to you next time in Mrs. Luce's class.
Sincerely,
Jon Wolfe

Date: Fri, 22 Mar 1996 00:33:41 -0500
From: EFLuce
To: WolfTrip
Cc: Bcreading
Subject: Re: School

Jon:
Thanks for writing. I get bored sometimes too. However, I think that this is really exciting that you are helping Mrs. Luce to learn how to get around on America on Line and showing both of us how we can have an online conference between your class at school and my office at the university. I hope that my students learn a few things when they are with me even if it is only that they have a few lessons that they can teach me and that I am open to learning something new. When that happens school just seems to come alive.

I hope that you receive this reply at home, but also that a copy of it arrives at school tomorrow for y'all to read and then write back to me.
Sincerely,
Dr. Luce

I must admit that I didn't find that much to get ESL students hooked on, but there were some sites that would be good and many sources for pen pals who are also ESL students. This would probably be a great way for these students to share experiences and perhaps not feel quite as isolated.
Many of the sites that I did find gave helpful hints for teachers who have these students in classes. There were ongoing dialogues about ESL and programs that work and many discussions of educational philosophy in relation to language acquisition. I must admit that I hadn't thought about Krashen in a long time!

The unanticipated outcomes from that teacher's professional development plan proved to be much more exciting and they became part of a winning formula that met with student enthusiasm and interest,

parental support and endorsement, as well as administrative interest and approval. Good teacher's plan carefully for instruction, but they also are alert and make the most of unanticipated outcomes. If it were not for the existence of a differentiated faculty development and professional performance appraisal system for the teachers in the middle school setting neither the teacher nor her class would likely have gone "online." Without technical assistance from one of the students in the class (who was a hacker), this story of an online adventure could not be told. Nonetheless, if this story is to represent the transformation of education, it will be necessary to ask whether this story is just beginning or at an end.

WolfTrip

Things sure did come alive for a while. This correspondence and collaboration began on my semester break when I visited my wife's class to help her with her internet project and to recharge my batteries in a real secondary school, BCMS, where my wife is a middle school reading specialist. I am an assistant professor of curriculum and instruction with responsibilities for supporting and advising secondary education teacher education students.

It had taken a while to get an internet account created by the supporting academic computing unit for the middle school. Once the account name and password had been generated, a dedicated phone line had to be installed and a modem delivered. By the time of my break, the modem and the phone line were available. However, the modem still needed to be connected and communication software needed to be installed on the computer. I said that I would help. After all, I was partially responsible, or to blame, for this project. I had encouraged my wife to choose the professional development performance appraisal option. Now, she not only wanted to get on line. She also needed to be and she needed some help to do it. This was all new to her.

While touching base with the school's computer specialist about the modem and about the school's internet access, procedures and policies, it was learned that a mini-grant supported school access to America on Line for special projects. A logon name, BCReading, and a password was generated to support this professional development effort. Thus equipped, the professor returned to the reading room to set up the modem for use with the classroom computer and to show the reading teacher, his wife, that she could get online and complete her proposed work.

It was after the modem had been installed, but during the installation of the AOL account that I first noticed WolfTrip, or Jon as he is known by most people in everyday life. He had come to reading class and was quietly, but intently, watching me as I quietly, but intently, worked to get the classroom online. After about five minutes, he approached me with a host of questions fired in staccato fashion. He thought it was cool that the classroom might be equipped for AOL. He had an AOL account himself. He surfed there all the time. His questions came so fast my head was spinning. I was grateful that the class had other work to do so that I could finish up the installation and convince myself that this work station was ready for the reading teacher. She was relieved that the system seemed to work. She was interested in Jon's interest in AOL and in the computer. She was a bit apprehensive about what to do next, but that didn't last long because WolfTrip took the lead.

Shortly after my academic break ended, I received a phone call from the reading room at the middle school. There had been a request. Jon wanted to know if the class could "chat" online with me. I said that I thought that could be arranged. When did they want to do this, I asked. The answer was now.

To do this, I needed to turn on my computer and logon to AOL. This took a bit of time. I also had to follow Jon's directions for how to chat since I had not done this before, nor had the reading teacher. Jon told me, "Logon to AOL. Go to People Connection. Look for Rooms, then look for Private Rooms." This was beginning to be a bit frightening. We were out of control. What would we bump into on the way to Private Rooms?

"When you get to Private Rooms, look for BCReading. We will look for you. What is your login? We will look for it."

It took most of what was left of the time the class had that day for our first online encounter to occur, but

BCReading and EFLuce did meet in the Private Rooms and chatted. Everyone got a brief turn--Phil, Matt, Arin, their teacher, and of course, Jon. It all happened so fast and it was over before we had hardly begun. No hard copy of that correspondence exists because it was so unexpected and so new an experience for all of us, but Jon. Besides, there was not enough time to think about a hard copy since the bell had sounded at BCMS and the class had to be off to their next destination. I was calculating my online time and estimating my next AOL billing in my head. Later on, I thought about the value of a transcript of our session and made sure that I knew how to prepare one in the future.

It did not take long before the class wanted to chat again. Apparently, with Jon's help and prodding BCReading had put together an email message that they had sent to me that included questions for me to answer. Jon and the class also wanted to chat with me online again. Jane, my wife and their teacher, called me by telephone and asked if I could go online with them. The class really wanted to "chat." This time I was ready and while it took a while for my computer to boot up and to logon to AOL, once again I met with BCReading in a People Connection Private Room.

Bcreading: Hello we are here
EFLuce: I am here too!
Bcreading: This is Arin the one who was sick yesterday
EFLuce: I haven't really done this before so I have to be able to type well, but also know where to type.
Bcreading: I read Mrs. Luces letter from you to her and I am ready to answer some of your questions
EFLuce: What is the weather like up there? It is really crummy here today--rainy and damp.
EFLuce: Fire away!
EFLuce: Who is working the keyboard?
EFLuce: Cam you all see the screen in that little room?
Bcreading: Up here it is probably in the 30's and very cold it is like a whole nother winter
Bcreading: Arin is working on the key board sorry I am so slow
EFLuce: Who is there aside from Arin and Mrs. Luce?
Bcreading: Phil, Matt, and Jon do you want to talk to them now?
EFLuce: Are Phil, Matt and Jon there?
EFLuce: I will talk to anyone who wants to get on the computer.
Bcreading: You will get my other letter today when you get mail
EFLuce: Probably that is everyone, right?
Bcreading: Ok well see ya. Matt is coming onto the computer please respond to my letter Bye
Bcreading: Hi
EFLuce: Good, I will look for it tonight. I will have to keep marking papers after we finish with this.
Bcreading: Hi
EFLuce: Who is there now?
Bcreading: I am going to Savannah G.A.
EFLuce: Is that Matt who is going to Georgia?
Bcreading: yes
EFLuce: What is going on in Savannah, Georgia?
Bcreading: My grandparents live there
EFLuce: That is a question that you had to think about I guess, or is typing something that you are still lear. . .
Bcreading: what
EFLuce: Are you still there? I got a gong sound that stopped my last sentence.
Bcreading: yes
EFLuce: How many of you know how to type? Did you take classes in it or have you just learned it on your own?
Bcreading: Phil is going to get on now
EFLuce: Hi Phil!
Bcreading: Yes I take typing lessons
EFLuce: Are you all behaving yourselves today?
EFLuce: What is the band playing in the next room?
Bcreading: yes, of course
EFLuce: Do they have their instrument cases cluttered in the hall? If so, watch your step on the way out!
Bcreading: yes
EFLuce: Is that still you Phil?
EFLuce: Have you eaten lunch yet?
Bcreading: yesIwant to talk
EFLuce: Do you eat the school lunch or do you bring your own? Or, do you skip lunch altogether?
Bcreading: Do you like the sixers
EFLuce: Fire it up Phil!

BEST COPY AVAILABLE

EFLuce: Yes. But they are pretty pathetic this year even after trading Bradley.
Bcreading: The coaches son goes to school here.
EFLuce: If they had only drafted Brad Daugherty years ago they would have had a center to build around.
Bcreading: Jon is going on now
Bcreading: Hi Dr. Luce
EFLuce: Lucas' son? I think he is a good coach. Has the team been sold to Comcast yet?
EFLuce: Hi Jon!
Bcreading: Hi
EFLuce: How much more time is left in your class?
Bcreading: 10 minutes
EFLuce: Is this fairly interesting?
Bcreading: yes
Bcreading: How is the wheather down there
Bcreading: did you get any flood
EFLuce: I haven't done a whole lot with online services doing this. The weather is WET and on the cool side.
Bcreading: When class is over Mrs. Luce is going on.
Bcreading: Mrs. Luce is going on I will e-mail you soon
EFLuce: I hope that you all keep writing to me, but make sure to get your other work done!
Bcreading: This was good but not a lot of work went on in class
EFLuce: Doesn't this count as work?
Bcreading: Yes it does but not when we are all standing around . . .
Bcreading: bye bye!!! From all of us
EFLuce: Ok, that is probably the best thing to do. Compose off line and then put your messages out
EFLuce: Bye.
Bcreading: bye
EFLuce: over and out!
Bcreading: we are leeving now
EFLuce: Me too!

Afterward, the class wrote to me by email about being online. They were very excited. The sessions online had been interesting, but confusing. Everyone wanted a turn at the keyboard and electronic messages passed each other seemingly before they all could be responded to or answered. By printing out transcripts of the online conversations, we all became more aware of our typing accuracy if not our spelling ability. A stage of relationship building had begun with the class and WolfTrip was the facilitator.

Arin and Jon turned out to be "techies" while Phil and Matt were into sports. Arin and Jon enjoyed being online whether in chat sessions or in the exchange of email that usually revolved around the ways that they or their classmates and families were using computers. Phil and Matt mostly wanted to talk sports. Phil was up on how all of the professional teams were doing and wanted to know what I thought about their play. Matt was a soccer player, as I had been at his age, and took the subject of his play very seriously. With Arin and Jon I could exchange email about how they were using computers in and out of school and what they liked to do with them. With Matt I could exchange email about soccer and how he and his indoor team were doing. If I misunderstood something that Matt thought that he had told me, he would make sure in no uncertain terms that I understood his view of things, for example that he was not only a goalkeeper for his indoor soccer team, but that he also scored goals as a midfielder, sometimes several goals a game. Phil never quite forgave me when in one early email letter to the class I seemed to have responded to everyone but him. As a result, I almost always had to remember to address messages to members of the class taking pains to respond to Phil first.

One evening when I had gotten in late from my office and had logged on to my AOL account and was responding to a piece of email from BCReading, I was surprised by a "splash" across my screen. It was WolfTrip who had discovered that I was online and he had known how to contact me. He wanted to have a chat in one of the People Connection Private Rooms. This too was an unanticipated outcome.

Since it was 10 pm Central Standard time (11 pm Eastern Standard time), I was tired. I also was not sure that I should be having a private online chat with one of my wife's students at that hour even if he was our best internet consultant at that moment. I made some excuses to WolfTrip about having a long day and needing to finish up my email letter to his class. Could we chat online some other time? Not a problem, he replied.

When WolfTrip broke in and suggested an online chat a new set of issues came into focus. It seemed important to contact his parents, and possibly the parents of the other students in the class, so that they were formally notified that their children were doing some reading and writing online using email and that this was one activity that was being integrated into the work of the class. While the school principal was aware that this teacher and her class might be exploring internet resources, it also seemed even more important to keeping the administration informed about these activities both because it looked as if they might spill over into out of school contexts, but also because when the class went online the students were crowded around the computer terminal monitoring the sessions. This was not a traditional snapshot of what reading class usually looked like. It was important that there be agreement that this activity be considered as being "on task."

In the end, the principal was delighted that these students were reading and writing online. Her only wish was for more students to have this experience in school. When contacted and informed about the BCReading's online adventures and about WolfTrip's recent nocturnal "surfing" encounter, his parents too were very supportive. It turned out that he had permission to go online and to explore the internet on his own. They were pleased to know that he was able to use what he knew about navigating the "net" in school and happy that this seemed to be influencing him to want to come to school more than was sometimes the case.

The next email message from BCReading seemed to confirm both that we had just had a narrow escape from potential trouble, and that we were onto something that seemed to offer the remedial reading students motivation to engage in authentic reading and writing.

```
Subject: hi
Sent: 3/25/96 11:08 AM
Received: 3/25/96 10:36 PM
From: Bcreading
To: EFLuce
CC: Bcreading

Dear Dr. Luce
I had fun talking to you on-line the other night. I can see how you got tired. I just had nothing to do
and I saw that you were on-line so I sent you an instant message. My parents saw one of the messages on
the computer and thought that I was talking to a strange guy but I told them that it was Mrs. Luce's
husband. You can still send me messages on-line so it is ok.
Fondly,
Jon

Dear Dr. Luce,
I do play outdoor soccer. I don't play goalie. I play midfield. The indoor games are only 25 minutes
long. In one game I scored four goals. I don't wear pads in goal. I got rug burns.
Matt

Dear Dr. Luce,
I wanted to Know if you Like Watching basketball. Did you watch the L.M game? How about football? Do you
like that? Are you an Eagle fan?
From Phil

Dear Dr. Luce,
Thank yo for writting back to me. It was nice to read mail instead of doing work. It was deightful.
Please write back. On Friday I am missing school to go to Washington D.C. I am so excited. Have you evr
beento Washington D.C. before? I havn't. I am going to get a book out of the library so I know where to
go. But I Am coming back on Monday to finis. the last day of school before break. Where are yo goig for
break? Anywhere you havn't been before? Please tell me all about it when you come back. I can't wait. How
many classes hav you taught today? Was it boring? What are yo doing tonight? have you ever been to FL?
My d-d just came back from his vacation visiting my grandmom and step grandpa. They really live in NJ but
they nave a house in FL so they can see my cousins in Coral Springs. Talk to you later. Please write
back!!!!!
-Arin

Dear Eric,
Were they ever excited to get your messages! I printed them out so that they could read them and think
about what to write, then we went on with class and each one responded! I'll call Jon's parents this
afternoon.
Love,
Jane
```

Aside from technological literacy and responding to and tapping student interests, this activity seemed to offer an opportunity to make writers and readers out of these students, rather than for them merely to be

BEST COPY AVAILABLE

students who wrote and read just to comply with adult demands. Yet, as Arin's posting reveals email was viewed by the students partially as an escape from reading, writing and schoolwork. They were using skills of decoding and encoding. The importance of spelling and grammar was now evident to them as they reviewed the printouts of their online sessions. The importance of composition as part of the writing process seemed to them more and more to be part of getting it right when they communicated using email and the content of the mail they were sending and receiving was rich.

Nonetheless, they also seemed to feel that they were getting out of work by going online. They didn't always see this activity as really being schoolwork. It was too much fun. Jon wrote:

```
Dear Dr. Luce,
Thank you for responding to me. Maby sometime in class or at my house we can go into reading in People
Connection. I have a lot of fun talking to you on line. I don't know anyones screen name except yours.
Good luck on grading those papers. I think that it is really cool that we can talk to you in class. Don't
tell Mrs. Luce but it takes time off class time.
Fondly,
WolfTrip
```

Classroom management issues emerged. The students all wanted to get online at the same time and this was a situation where there was one computer that was being shared by four students. This correspondence and relationship would have been even more of a challenge to manage if the computer/student ratio had been higher. Even with a favorable student/computer ratio, it was hard to rely on technology to carry the full weight of an effective instructional program. Sometimes it was unreliable and hard to count on when needed. Jane wrote:

```
Dear Eric,
Today was difficult. We had trouble with AOL loading, the whole thing just froze. Jon did some
adjustments on the hard drive. For some reason there wasn't enough memory. We turned off the computer and
got back on later. What do you think happened? Don't forget Phil, he is feeling left out. You even forgot
his name on the last correspondence. He can be touchy anyway. I still don't have the system down pat!
Talk to you later.
Love,
Jane
```

Phil never really ever got over the feeling of having been skipped over in the first round of email messages.

```
Dear Dr. Luce,
Your response to my last letter never came. Here's what I wanted to Write. I wanted to know if you liked
to watch the Eagles. Who is your favorite player? Do you like the Phillies?
I know they are not very good but they may be better this year.
Please write back this time to me.
From Phil
```

Moreover, familiarity eventually seemed to breed boredom. As the activity of reading and writing email became routine, it began to seem more like work to the students and their adult partners. There was a point where the students and the adults involved in this activity began to wonder what was the point of being online and where was this activity going? This was evident first in an observation about the students reaction to my questions about their posting of a book review on the Electronic Schoolhouse Bulletin Board. Jane observed:

```
They really are on to the next thing but your questions to them are good - to make them think about the
purpose of the questions or why the author used questions as a way to move the story. Maybe you can take
some of their examples and go from there
```

Later, when my Secondary Education Curriculum and Instruction Students entered into the correspondence with BCReading, the goals and purposes of being online were further called into question. One of my graduate level teacher education students wrote:

```
Hey Guys! It was great getting your letters although I have to admit that it is a little weird writing to
folks that I don't know.
```


BEST COPY AVAILABLE

BCReading concurred:

```
Dear Friends,
We think it is weird to write to people we don't know also!
```

Transformation or Just Another Trend

In concluding her report on her professional performance project, the reading teacher wrote:

```
I have really just begun my relationship with the internet. Time is a problem. The best time to get onto
Lower Merion's system is after 10 pm when I'm not at my best. I am looking forward to being able to hone
my skills this summer and to being able to incorporate the Net into my classroom on a more regular basis.
Thanks for this wonderful opportunity.
```

Over the course of this online adventure, it became clear that computer access was not the solution to all the educational challenges that this reading teacher and her students faced. Nonetheless, having access to a computer, the internet and email in this middle school setting did result in new forms of excitement and anticipation while remedial reading students were reading and writing. These were students who have not always felt that way about school reading and writing tasks since one of the reasons why they were placed in reading class was that they all had been identified as performing seriously below grade level according to standard measures of reading proficiency.

Having access to a computer, the internet and email in this middle school setting did help to support the development of new technological and literacy skills and interests for the students and the teacher. The technology made it possible to receive and generate authentic input and output while reading and writing. It also allowed a middle school student to act as a guide and a teacher not just for his teacher, but for a university based teacher educator as well. The generation of authentic input and output might possibly be considered to be school work that is fundamental, even if it also proves to be fun. The sharing of student and teacher expertise might rightly be viewed as collaborative learning. The school district's differentiated professional development model created an opportunity and the motivation that allowed a teacher to make time to try to learn about technology in the hope of improving teaching and learning.

Conversely, it would be hard to demonstrate that the academic achievement of Arin, Phil, Matt and Jon was transformed in the short run by the introduction and use of new technology in their classroom. In the long run, it is too soon to know what the outcomes from this activity might be.

Planning to use the available technology was logistically challenging since there was only one teacher, one terminal and four interested students. Even with this somewhat favorable student/teacher/technology ratio, technological access, support, and time for use and learning were limited. If the internet practices that were tried with this class were to be more successfully integrated into the curriculum, the culture of computing in the school might be challenged, the status quo upset and conflicting demands for technological access and support might not easily be reconciled.

Teachers would still need to have or find time to learn how to use new technology themselves if they are to be expected to make good use of it with their students. Also, as the experience of working with BCReading and WolfTrip shows, new instructional technology in the classroom may be an answer, but not "the" answer, for engaging student interest. Eventually the BCReading students grew tired of tending to their email and returned to some of their other work. An online conversation with BCReading near the end of the school year after a lapse in contact of more than one month illustrates that new instructional technologies might work best as options to be exercised with discretion, rather than as the center of all learning activities.

```
Bcreading: please go into the private room called Bcreading
EFLuce: OK
Bcreading: cool!!!
EFLuce: Yeah!
Bcreading: where are you?
EFLuce : Here I am!
EFLuce : Where are you?
```

BEST COPY AVAILABLE

Bcreading : We have been waiting, what took you so long!
Bcreading : Arin is now on
EFLuce : I know. It took a long time. Hi Arin!
Bcreading : hi Dr. Luce how are you doing\
EFLuce : Ok. Long time since we chatted/met like this!
Bcreading : how is the weather it is about 80 here. it's a very noce day
EFLuce : You read my mind! It is about 90 here and sunny.
Bcreading : it isn't as boring because we haven't been on for awhile. . .

References

Kaplan, D.A. and Rogers, A. "The Silicon Classroom," *Newsweek*, April 22, 1996, 60-61.

Pedersen and Moss, F. *Internet for Kids: A Beginners's Guide to Surfing the Net*, Price, Stern Sloan, Inc.: New York, New York, 1995.

Robinette, M. "Who Will Teach the Teachers? The Realities of Technology in Education," *MacHome Journal*, April 1996, 68-69.

Schepp, D. and Schepp, B. *Kidnet: The Kid's Guide to Surfing Through Cyberspace*, HarperCollins Publishers, Inc.: New York, New York, 1995.

Winik, L.W. "Do Computers Help Children Learn," *Parade Magazine*, February 2, 1997.

[TOP]

BEST COPY AVAILABLE

Children and Young Adult Literature on the Internet: an Introduction

Ruth Kinnersley

- Abstract
- Introduction
- Guides to Children's and Young Adult Literature on the Internet
- Full-Text Children's Literature
- Bibliographies and Reviews of Children's Literature
- Articles Related to Children's Literature
- General Sites Geared Toward Children and Education
- Conclusion
- Addresses for Sites in this Presentation

Abstract

This presentation is intended to introduce some Internet sites related to literature for children and young adults, and to provide a sampling of the types of sites which are available. Guides to children's and young adult literature on the web; sites which contain full-text, reviews, or bibliographies of children's literature; teaching activities; and general sites for kids which include children's and young adult literature are examined. Those who are interested in Internet-based teaching activities, or ideas for the use of children's and young adult literature in the classroom, would find this presentation useful.

Introduction

There are a large number - and a huge variety - of sites on the Internet which concern literature for children and young adults. This presentation is intended to introduce a few key sites, and also to provide a sampling of the many interesting and helpful sites which contain, or relate to, children's and young adult literature. First we will look at guides to literature for children and young adults on the Internet. These sites provide access to the vast majority of children's literature sites on the web and are the best places to begin. Second, we will look at selected sites which contain actual, online, full-text literature for children and young adults. These sites provide a sampling of the kinds of literature available for children and young adults on the Internet. The third category! of sites we'll examine are those which contain reviews, bibliographies, and awards lists. Fourth Will be sites which contain activities related to children's and young adult literature, particularly teaching activities for classroom use. Finally, we'll look at more general sites which contain activities for kids, of which stories or literature is a part.

In selecting sites for this presentation, a number of factors were taken into consideration: comprehensiveness of a site (the depth and/or breadth of material related to children's literature), how well the site is maintained and updated, who created or maintains the site, and individual features, such as unique lists, chat areas, and search engines.

Guides to Children's and Young Adult Literature on the Internet

The first site in this presentation is one of the best "organizing" sites for finding children's lit on the Internet. The Children's Literature Web Guide http://www.ucalgary.ca/ ~dkbrown/index html) was created and is maintained by David K. Brown Director of the Doucette Library of Teaching Resources at the University of Calgary. He provides access to online children's stories, general children's literature

resources, journals and reviews online, conferences, related associations on the Internet, discussion groups, links to children's authors and publishers, bestseller lists, and resources for parents, teachers, storytellers, and writers and illustrators. This site has particularly good links to "best books" lists and children's book award lists. A unique feature of this site is a list of movies and television based on children's books. The site focuses on links to international, English language pages (with some exceptions). A particularly nice feature is a brief description of each site to which a link is provided. The creator has indicated which are, in his opinion, the best sites by marking them with a bouquet of flowers! A search engine is available for those who are looking for specific material, but this is a wonderful site to browse, and, for children's and young adult literature, is a better starting place than the general web searchers.

Another "general guide ' is **Electronic Resources for Youth Services** (http://ccn.cs. dal.ca!-aa:31/childlit.html). While not as comprehensive as The Children's Literature W eb Guide, this page is well-laid out, with lots of helpful links. The areas covered include award inning books, book reviews, reading and storytelling, writing resources, online children's literature, educational sites, links to authors, publishers, and booksellers, associations, listervs, news groups, and miscellaneous resources. This site also provides keyword searching capabilities. A youth chat room for all who want to discuss topics related to children's literature has recently been added to this site. There is also a "Site of the Month," featured on the first page.

Kay Vandergrift's Special Interest Pages (http://www.scils.rutgers.edu/special/kay/childlit.html/ and http://www.scils.rutgers.edu/special/kay/yalit.html) provide an entirely different way to access children's and young adult literature on the web. Dr. Vandergrift teaches children's and young adult literature in the School of Communication Information and Library Studies at Rutgers's University. Her page is a combination of information a student of children's and ya literature would need (including evaluative questions about the literature, the history of children s lit, the context in which to approach and understand young adult literature) and links to other sites of interest to students and those uith a less scholarly interest in the field. The background she provides malces it well worth your while to take a look at this page and its links, especially if you are a teacher or student of children's literature. Her list of links for authors of children's and young adult literature is particularly long!

The final site in the category of genera] guides is **Children's Literature Reference** (http://www.lib.utexas.edu/Libs/PCL/child/). This site is designed to provide access to "basic sources in the area of children' literature," and it succeeds admirably. Maintained at the University of Texas at Austin, a unique feature of this site is its links to bibliographies of materials held in the University of Texas libraries. "UT Austin Resources" is one of the links from the main page, and links to UT Austin bibliographies are included on other pages, where tines are appropriate. The categories for links include Awards and Honors, Classics, Teacher Resources, Authors and Illustrators, Genre, Suggested Web Sites, Reviews and Criticism, and Electronic Journals. The links under Teacher Resources include Associations; Bibliographies; Indexes, Abstracts, and Search Engines; Libraries; Listservs; and Lists of Online Books and Miscellaneous Resources. A one-sentence description accompanies each link. Along with the Children's Literature Web Guide, this is one of the more comprehensive sites for providing links to additional Internet sites which relate to children's and young adult literature.

Full-text Children's Literature

As with all of the following categories, there are additional resources linked at each of the sites above, including many more than are reviewed here. The purpose of this section is to provide a sampling of the variety of children's literature on the Internet, and that varies, is wide.. While one may not prefer to read the entire text of Huckleberrs Finn online, it still can be useful for class activities to have access to the full text of children's and young adult literature classics through the Internet. Stories which combine video and audio components with the text constitute another option in children's and young adult literature - one which displays the capabilities of the World Wide Web Sites which contain stories written by children, provide "add-on" stories, and display stories written by a class provide an opportunity for learning which is unique to the Internet.

The first kind of literature we will examine online is the classicschildren's and young adult books which are in the public domain and whose text has been entered onto the Internet in its full form. These two examples are gopher sites: gopher://lib.nmsu.edu/1 1/.subjects/ Education/.childlit/.childbooks/ and gopher://gopher:cascade.net/1 1/pub/'LiteraturelChildrens Here are located some of the works of Louisa May Alcott, Charles Dickens, Rudyard Kipling, Robert Louis Stevenson Mark Twain, and others. Gopher sites, which don't use graphics, are ideally suited for long amounts of texts. Look at gopher://lib.nmsu.edu/11/.subjects/Education/.childlit/ 11.subjects/Education/.childlitl for an interesting array of resources related to children's literature.

Another type of literature of interest to children and young adults is found in **Tales of Wonder** (http://www.ece.ucdavis.edu/~darsie/tales.html). This site has collected folk and fairy tales from around the world and placed them online. Sources for the tales are cited, and the text of the tales is in large print, on a colored background, which is very appealing to children. The tales are truly from all over the world: Asia, Russia, India, Scandinavia, Scotland, Africa, and the Americas. This site could used in the classroom for comparing the similarities and differences of tales from different lands.

The **Internet Public Library's Story Hour** (http://www.ipl.org/youth/StoryHour/) provides pictures, and sometimes audio, to accompany the handful of stories they provide. The stories are truly charming; particularly "Do Spiders Live on the World Wide Web?" The Internet Public Library also has other activities for children, and their teen division covers a wide variety of topics of interest to y oung adults, such as career and college, issues and conflicts, arts and entertainment, books and writing, and health.

Another application of the Intemet to the publishing of children's literature is to publish stories children have written themselves. One site that does this is KidPub (http://www.kidpub. org/kidpub/). You can find original stories from kids of all ages - a sampling revealed stories from children aged 4 1/2 to 17, living around the world. In addition, there's a chat area, a message center, a collaborative story (where each child adds a paragraph to make the story progress), and a place to hook up with an Intemet pen pal. The site administrator also provides a form and instructions on how to send your own story to KidPub.

Bibliographies and Reviews of Children's Literature .

Virtually every site uhich deals with children's and young adult literature also has some lists of books, collection of reviews, or links to reviews and bibliographies at other sites. A couple of "standard" examples, and some more unique sites uill be discussed here. One can't get more standard than the online version of the American Library Association's Booklist (http://uuu.ala.orglbooklist/). Booklist has a selection of reviews and feature articles available online from olumes 92 and 93. This represents a nice collection of reviews for children's and young adult literature, as uell as adult literature, multimedia, and revieu s of reference materials. One of the pu poses of this ueb site is to interest ueb searchers in subscribing to the print ersion of Booklist, and subscription information is included.

Another review site, which has aluays been an online review journal, is Notes from the Windowsill (http://www.arrnory.com/~web,notes.html). It was formerly knoun as The WEB Online Review. They are one of the few online children's book review services that does not also sell children's books. The revieus are both descriptive and evaluative. The home page allows access to the issues of Notes from the Windowsill via gopher or ftp, as well as pick of the month (editor's choice for the best, most interesting or most memorable book reviewed each month), subject bibliographies, and links to other pages.

The **Cooperative Children's Book Center** is a non-circulating examination center and research library for adults uith an interest in children's and young adult literature. Located within the School of Education at the University of Wisconsin-Madison, it is designed to provide a collection of current, retrospective, and historical books for children and young adults, provide inforrnational and educational services based on the collection to Wisconsin librarians, teachers,
students, and others, and to support teaching, reaming, and research needs. Their web site (http://uu~,.soemadison.wisc.edu/ccbc) provides information about their services and publications; a list

of Wisconsin authors and their current books, and a variety of list of books, including their choice of best books from the current year, books translated from foreign languages, and multiracial books. They also provide addresses for small and alternative presses.

The Children's Literature Home Page (http://www.parentsplace.corn/readroorn/ children/index.html) provides reviews for multimedia materials designed for children and young adults, in addition to reviews of books. There are over 60 multimedia titles listed here, with revieus uhich include information on uhat equipment is needed to run the program, appropriate ages, and an evaluative description. Besides softuare reviews, there are subject bibliographies, "Top 150 (Book) Choices for 1995", and an online archive of reviews. This web site is based on the print magazine Children s Literature, and included is information on hou to subscribe to the
print version.

Activities Related to Children's Literature

Besides reviews of children's lit, on the Internet, there are sites which provide ideas for teaching activities based on children's and young adult literature. Again, just a sampling of sites is provided here; there are a great many more available to the web searcher.

Carol Hurst urites a column for Teaching Pre-K-8 magazine, and she also has a wonderful web site called **Carol Hurst's Children's Literature Site (http://www.crocker.com/** ~rebotis) Her activities use children's literature across the curriculum, in the Pre-kindergarten
through grade 8 classroom. Besides listings of titles, there are curriculum areas, professional topics, subject lists, and an index. In each of these areas, a link is provided for each title listed. Under each title is a review, things to notice and talk about, activities, related books, related areas within the site (usually leading to a subject list), and related areas on the Internet. The activities are appropriate for the grade levels for which the book is recommended. A search engine is also part of this site, for those seeking specific information.

The **ERIC Clearinghouse on Reading, English, and Communication** provides a variety of activities for teachers and for parents (http://www.indiana.edu/~eric_rec/index.html). For teachers, there are lesson plans, parent involvement materials, and professional development workshops. For parents. there is a section entitled "Family Learning" v;hich includes resources for parents, and a senior partners pen pal program, matching adult letter writers with junior partners. Of particular interest is Parents and Children Together Online, an online "magazine" with read-along stories, interactive storytelling, articles for parents on all aspects of children's education and a parent's role in it, and reviews of children's books. There are also links to other sites of interest to parents. children, children's writers, and educators.

Many publishers also provide lesson plans for the children's literature they publish. One example is Bantam Doubleday Dell Teacher's Resource Center (http://www.bdd.com/forum/ bddforum.cgi/trc/index/general). Check the sites listed at the beginning of this article under "Major Children's Literature web pages" for lists of publisher's sites. Some author's home pages also include teaching ideas for their books.

General Sites geared toward Children and Education

Some sites designed for children aren't specifically related to children's literature, although it may be a part of the site. One such (outstanding!) site is maintained by Brendan Kehoe. It's called simply Kids on the Web (http://www.zen.org/~brendan/kids.htrnl) and its goal is "to collect, in one place, a body of information that people can use either to let kids play with stuff on the Internet, or to find the things they need for their work related to the care and education of children." The site includes links to sites for children, divided into "fun stuff" and educational sites, information about kid's safety on the Internet, and sites related to children's books and stories. For a quick overview of how many sites on the Internet are geared to children, start here.

The Internet has also proved to be a boon to home-schoolers, and many home pages from this group provide educational activities for children. One good example is **the Teel family on the Web** (http://www.teelfamily.com). The Teels live in Alaska, and many of their educational units and activities are related to their state and the unique features of living in the north. They have included a search engine, for those looking for specific material. The Teel family site is linked to the Homeschool Web Ring (http://www.integralink/com/). This is part of the Integral Link Web page, uhich is designed to serve as a resource for online and home-based education. Besides the Homeschool Web Ring, which will take you to other home-schoolers' sites, the Integral Link Web page provides an online Internet course, a list of online college courses f om Edmonds Cormnunity College, home-based education resources, online education resources and links, and more! This provides easy access to materials and activities designed for and by homeschoolers.

Conclusion

The purpose of this presentation has been to provide a brief introduction to Internet sites which provide ideas and resources for people interested in children's and young adult literature. It just scratches the surface -- for every site described here, there are many more on the Internet, waiting to be discovered. Some have even been created since this presentation was prepared! The Internet has a vast amount of valuable information related to children's literature.

[TOP]

Computerized Collaboration: Multimedia for Middle Level Science Teachers

William J. McKinney, Ph.D.
Deborah Wooldridge, Ph.D.
Rebecca Hines, Ph.D.

- Abstract
- Introduction
- Assembling the Project Team
- The Course
- The Classroom Experience
- The Final Product
- Discussion

Abstract

In January 1996, Southeast Missouri State University's College of Education was awarded an Eisenhower Professional Development Grant for the development and execution of a graduate level course in multimedia classroom techniques for middle level science teachers. This paper will discuss:

* the assembly of a cross-departmental interdisciplinary team for proposal development, course development and course instruction;

* the course, SE606 - "Multimedia in the Middle Level Classroom;"

* the classroom experiences of the instructors - university professors, with a class comprised of public school science teachers;

* the technical and pedagogical lessons learned from using "Authorware Star" as an authoring medium.

1.0 Introduction

Middle level education must meet the special needs of adolescents. Adolescence is a time of significant growth and change, and it is necessary that education place significant attention on children in the early "transescent" years. In order for schools to do this, they must cease looking at middle level students as "big" youngsters or immature pre-teens, and see them as humans at a turning point in their lives. Schools must reflect this attitude in working with these students and preparing teachers to teach at this level. Furthermore, they must assume the responsibility to match curriculum and the organization of the middle school with the intellectual, emotional and physical needs of the transescent student who is caught in a turning point.

Thus, as stated in the book Turning Points, (Carnegie Council of Adolescent Development, 1989, p. 8) middle level schools are "potentially society's most powerful force to recapture millions of youth adrift, and help every young person thrive during early adolescence . Middle level education has been identified as an essential element for systemic change. In order to improve academic achievement, staff and students' attitudes and behaviors, and instructional practices and procedures, middle schools have the opportunity to create smaller schools within schools, decrease the number of times student change classrooms and teachers, increase personal attention by team teaching and mentoring, reform grade retention policy, eliminate tracking, promote cooperative learning, revitalize the curriculum and improve the student-teacher relationship.

The recent changes in technology offer an important means for enhancing these educational improvements. The proliferation of inexpensive multimedia computers and interactive software has led to an increased use of computers in all educational levels. Middle level education is no exception.

This new technologically enhanced pedagogy will require technologically savvy teachers. In January 1996, Southeast Missouri State University's College of Education was awarded an Eisenhower Professional Development Grant for the development and execution of a graduate level course in multimedia classroom techniques for the professional development of middle level science teachers. The objectives of the project were four-fold:

i. to provide participants an opportunity to extend and enhance their knowledge and understanding of multimedia software and to develop multimedia software;

ii. to provide participants and opportunity to investigate available computer-based resources that can enhance the science curriculum;

iii. to provide participants an introduction to and practice using the basic skills necessary to build multimedia presentations for classroom use; and

iv. to provide participants an opportunity to enhance their skills in the area of staff development in the field of technology integration.

Too often, such professional development opportunities are out of reach to educators because of geography, high costs, timing, and the failure of programs to meet perceived needs. By providing training regionally, costs to participants are reduced and broader participation is encouraged at sites that are in closer proximity to the educators. As such, three sessions of the class were run at strategic locations throughout Southeast Missouri State's service region. The following pages provide a discussion and description of the project and offer some summary remarks on the lessons learned from this cooperative effort.

2.0 Assembling the project team

From the very start, it was essential that the planning and execution of the project employ the aptitudes and expertise of a range of individuals from the University and the region's public school districts. To maximize the potential success of the project, representatives from the following constituencies were utilized:

Middle Level Science Instruction
Special Needs Students
Administration
Educational Assessment and Planning
Curriculum Design
Technology
Multimedia Design

In this way, the project team was able to meet the needs determined in a professional development needs assessment conducted in 1995.
The needs assessment survey was conducted in the 24 county region of Southeast Missouri. The survey addressed 6 areas: instructional process, classroom management interpersonal relationships, professional concerns, student concerns and special education concerns. The topics under instructional process included: student motivation/teacher expectations, improving study/thinking skills, cooperative learning, student learning styles, active learning, coordination with special education, multicultural education, technology applications, performance-based assessment, and integrated learning. The analysis revealed that school districts were interested in professional development activities related to technology application, improving thinking skills, active learning strategies and student motivation (see Table 1 below). These four areas of concern formed the core of the multimedia instruction project.

TABLE 1

PROFESSIONAL DEVELOPMENT NEEDS ASSESSMENT SURVEY RESULTS

Instructional Process	**District Totals**	**Rank**
1. Student Motivation/Teacher Expectations	1281	2*
2. Improving Study/Thinking Skills	1367	1*
3. Cooperative Learning	922	8
4. Student Learning Styles	989	5
5. Hands-on Learning/Active Learning	1106	4*
6. Coordination with Spec. Ed./Rem. Prog	872	9
7. Multi-Cultural Education	717	10
8. Technology Applications-Internet, etc.	1224	3*
9. Performance Based Assessment	935	6
10. Integrated Learing, etc.	933	7

The resulting Collaborative Planning Committee consisted of members from regional public schools, the Southeast Missouri State University Regional Professional Development Center, College of Education, College of Science and Technology, College of Liberal Arts and MAP 2000.

3.0 The course: SE606 - "Using Multimedia in the Middle Level Science Classroom"

The crux of the project was the development of a graduate level course in multimedia software use and development. This product-oriented course was designed for middle level science teachers interested in learning to integrate multimedia presentations into the content curriculum, so the course had no formal course prerequisites. Participants worked in cooperative groups to examine the state science curriculum frameworks and "Show Me Standards" and gather resources to supplement curriculum objectives. The participants were then guided through the process of developing multimedia presentations which incorporate a variety of video materials, scanned images, sound and other reference materials to supplement the science curriculum. The course was offered at three different locations (Jackson School District, Bloomfield School District and Giddeon School District), with participation limited to 22 students per site. The course syllabus is included below.

COURSE SYLLABUS
Southeast Missouri State University

THE TEACHER AS COMPETENT PROFESSIONAL EDUCATOR

Dept. of Secondary Education Course No.: SE606

Course Title: Using Multimedia In the Revised: Fall 1996
Middle Level Classroom

I. Description and Credit Hours of Course:

The is a product-oriented course designed for teachers interested in learning to integrate multimedia presentations into the content curriculum. Participants will work together to produce a CD-ROM that includes multimedia presentations to be used with the standard middle level curriculum. Participants will receive a copy of the CD generated in class for future use at respective sites.(3)

II. Prerequisites:

Permission of instructor required; participants should have basic computer skills but extensive experience in working with computers is not a necessity.

III. Purposes or Objectives of the Course:

The participants will:

A. Examine and practice using two computer-based instructional models to enhance the delivery of content curriculum.

B. Read and analyze literature describing the social, vocational, and pedagogical rationales for using computers in the classroom.

C. Investigate available World Wide Web sites that can be used as resources to enhance the content curriculum.

D. Build multimedia presentations for use in the classroom.

E. Receive training on presenting staff development workshops in the field of technology integration.

F. Receive training in performance assessment using technology in order to give parallel training to a team of teachers in their home district.

IV. Expectations of the Participant:

A. To read and discuss literature examining technology integration in the schools.

B. To work in cooperative groups to examine the content curriculum and gather resources to supplement curriculum objectives.

C. To participate, individually and in groups, in activities to build multimedia presentations that incorporate a variety of video materials, scanned images, sound and other reference materials to supplement the content curriculum.

D. To agree to engage in continued staff development/presentations in the area of technology integration as a means to promote the Show Me Standards and implement the new assessment system.

V. Course Content: Class Hours:

A. Shifting Paradigms: 9
Moving from the Industrial to the Information Age
1. Discussion: National and Regional Implications
2. Computers in the Classroom: What's working,
What's Not--A Review of the Literature.

B. Show Me Standards: Technology as a Change Agent 12
1. Review of Show Me Standards/Objectives

2. Discussion: Show Me Standards Goal 1&2
3. Discussion: Changing Roles for Teachers
4. Guided Practice: Building Contest-Directed Presentations

C. Technical Skill Training 12
1. Working with Authoring Programs
2. Importing Text and Graphing from Other Applications
3. Accessing Information On-Line
4. Downloading Text and Images from the World Wide Web
5. Writing Computer-Based Quizzes
6. Using Projection Panels for Whole-Class Instruction

D. Product Development 12
1. Developing Lesson Plans for Technology-Rich Classrooms
2. Building Multimedia Presentations
3. Writing Computer-Based Quizzes
4. Organizing Staff Development Presentations

Total Hours: 45

VI. Textbook:

Merril, P.F., Hammons, K., Vincent, B.R., Reynolds, P.L., Christensen, L., & Tolman, M.N. (1996). Computers in Education. Boston: Allyn and Bacon.

VII. Basis for Student Evaluation:

Students will be able to demonstrate the skills necessary to build a technology-based lesson plans.

Students will gather and utilize content materials needed to supplement the curriculum and will demonstrate this by generating content-directed multimedia presentations.

Students will analyze research in the area of technology integration and demonstrate an understanding of such by developing software appropriate for classroom use.

Students will synthesize information regarding technology integration and the Show Me Standards, and will develop a program for disseminating such information to their respective sites.

VIII. Knowledge Base:

Cohen, P. (1994). The On-Line Classroom. ASCE Update, 36(10), 1-6.

Conroy, M. (1994). TECH TRAUMA-The technology teacher's syndrome. Tech Directions, December, 38-39.

Dyril, O.E. & Kinnaman, D.E. (1994). Preparing for the integration of emerging technologies. Technology and Learning, May/June, 92-98.

Kinnaman, D.E. (1994). What it really means to integrate technology. Technology and Learning, May/June, 130.

McCarthy, R (1988). Making the future work. The road to curriculum integration. Electronic Learning, September, 42-46.

Missouri Department of Elementary and Secondary Education. (1995). Show me standards.

Peterson, N.K. & Orde, B.J. (1995). Implementing multimedia in the middle school curriculum: Pros, cons, and lessons learned. Technological Horizons in Education, February, 70-75.

4.0 The classroom experience: Technical and pedagogical lessons

Once the course was designed and approved by the University's College of Education and School of Graduate Studies, the only the execution of the course and the production of the final product remained. As is the case with any new technological experience, there were lessons learned by all involved, most especially those who actually conducted the class.

First and foremost was the hardware lesson. The project was designed to afford middle level teachers the opportunity to develop their own multimedia software using the development platform Authorware Star for Windows (Prentice Hall/Macromedia, Inc.). While the software indicates minimal hardware requirements as a 286 PC with 8MB RAM, it was the experience of the authors that a minimum desktop requirement is a 486 PC with 16MB RAM. No such machines were available in the computer labs at the class sites. Authorware will run on a 286 machine, but only reluctantly. In addition, many of the operations required in developing a useful multimedia application with the Authorware platform require the cutting and pasting of large files, whether they be sounds or graphics. While all machines used on the project were superior than the minimum Intell 286 microprocessor, none had more than 8MB RAM, and most had only 4MB. This made cutting and pasting operations for large files extremely difficult.

The quest for content provided several intriguing challenges. A multimedia program does not deserve such a label unless it incorporates at least non-textual visual material, and optimally sound and video or animation. Most of the teachers who enrolled in the course had ample course content in terms of still images, yet very little of it was in electronic form. This left the on-site instructor with two choices -- scan the images or help the teachers to retrieve relevant material from the World Wide Web. At the one location where a scanner were available, the on-site instructor spent many hours after class scanning the images for 20+ students on the one available scanner. For the other 2 sites, the scanner at the University's Center for Scholarship in Teaching and Learning was used. In all cases, this method posed the logistical problem of file size, and image quality had to be limited due to the fact that the scanned images had to be transferred from site to site on floppy disks. Two of the three sites were networked, and so Internet access was relatively straightforward, with large image files saved directly to the author's hard drive. At the Jackson location, however, there was no networking capabilities and no scanner. As a result, one of the University's open labs was reserved for two days so that participants could retrieve useful graphic and sound files. In this case, however, the problem of file size remained, as all files had to be transported via floppy disk.

The issue of file size was ultimately the most troubling. Authorware files are large, and depending on content, a modest Authorware-designed application can require 2-8MB of storage. Each of the middle level teachers who participated in the course wrote an Authorware application, leaving the project staff with the task of transporting 20-25 files at a time from the class site back to Southeast Missouri State University, where the programs would be edited and copied to a CD-ROM for final distribution (see Section 5.0). While most of these files were less than 1MB, and could thus be copied to a floppy disk and easily transported, others (approximately 1/3) were not. Quite simply, not every public school in the state of Missouri is networked locally, let alone hooked to the Internet. At one location (Bloomfield), the computer lab was indeed networked, both locally and to the Internet, so large files were sent via electronic mail to the University. At another site (Giddeon), large files were stored on an FTP site, and retrieved accordingly from the University. Finally, at Jackson, no networking capabilities were available. As a result, both the students and the on-site instructor were faced with some difficult editing choices with respect to the content of the Authorware programs. All files were kept to a maximum of 2.0MB, and those which exceeded the capacity of a high-density floppy disk were compressed using WinZip, with the resulting compressed archive copied to floppy disk. Hardware problems were not limited to the classroom locations. The University has had its own unique limitations in the final execution of this project, and these will be discussed in Section 5.0.

In terms of teaching the cours

M.A.S.T.E.R. I.T. (Math and Science Teachers Enhancing Resources Through Instructional Technology): A Multimedia Training Program for K-12 Teachers

Constance R. Schmidt

Nancy C. Keese

- Abstract
- Introduction
- Workshop Patricipants and Instructors
- Workshop Software
- Workshop Training
- Participant Multimedia Projects
- Workshop Evaluations
- Plans for Future Workshops

Abstract

The Instructional Technology Support Center and the Department of Educational Leadership at Middle Tennessee State University co-sponsored a four-day multimedia workshop for high school math and science teachers. At the workshop, teachers created multimedia applications for students to use in their classrooms. In this paper, the "M.A.S.T.E.R. I.T." workshop is described in detail. The following topics are addressed: (1) the workshop participants and instructors, (2) the software used in training, (3) the content of the training sessions, (4) the projects created by the teachers, (5) the participants' evaluations of the workshop, and (6) plans for future workshops.

Introduction

In July, 1996, the Instructional Technology Support Center (ITSC) and the Department of Educational Leadership at Middle Tennessee State University (MTSU) co-sponsored a four-day multimedia workshop for high school math and science teachers. The workshop was titled "M.A.S.T.E.R. I.T.," which stands for "Math and Science Teachers Enhancing Resources Through Instructional Technology." At the workshop, teachers created multimedia applications for students to use in their classrooms. In the following sections, we discuss: (1) the workshop participants and instructors, (2) the software used in training, (3) the content of the training sessions, (4) the multimedia projects created by the teachers, (5) the participants' evaluations of the workshop, and (6) our plans for future M.A.S.T.E.R. I.T. workshops.

Workshop Participants and Instructors

Fourteen middle school and high school teachers from five Tennessee counties participated in the

M.A.S.T.E.R. I.T. workshop. Ten were mathematics teachers, whereas the remaining five were science teachers. The teachers were selected to participate by their superintendents. The workshop instructors and assistants included four faculty members from teacher education departments at MTSU, three MTSU math and science faculty members, two curriculum specialists from the Tennessee Department of Education, a producer/director from MTSU's television services units, and an instructional technology specialist from the ITSC. Also, presenters from the Tennessee Department of Education provided valuable information about current math and science standards and curriculum frameworks.

Workshop Software

The main software package teachers used in the M.A.S.T.E.R. I.T. workshop was HyperStudio. HyperStudio allows teachers to combine text, graphics, movies, and sound into interactive applications students can use in self-directed learning. Participants also learned how to find multimedia resources in their subject areas on the World Wide Web using Netscape and how to create multimedia classroom presentations using Microsoft PowerPoint. All software applications used during the workshop were available on both Macintosh and Widows platforms. Participants chose the platform they preferred to use in creating their multimedia projects.

Workshop Training

Participants benefited from different types of training during the four-day workshop. Several two-hour training sessions were devoted to learning the basics of the software packages used during the workshop. Teachers were also shown how to use digital cameras and color scanners to import graphical images into their multimedia projects. This technical training was supplemented by training directly related to the teachers' content areas. Representatives from the Tennessee Department of Education discussed state and national curriculum frameworks in science and mathematics. Science and mathematics faculty at MTSU taught teachers how to locate resources on World Wide Web. Throughout the week, teachers were given blocks of "open lab" time for individual project development. MTSU faculty and staff were available to provide assistance during these open lab sessions. Finally, participants met with MTSU faculty and staff individually twice during the week to consult at length about their developing projects.

Participant Multimedia Projects

At the end of the workshop, participants presented their multimedia projects to their peers. All of the projects were produced using HyperStudio. The titles and authors of the 13 finished projects are listed in Table 1 below:

Table 1. M.A.S.T.E.R. I.T. 1996 Participant Projects

Project Title	Content Area	Author(s)	County
Intro. to Algebra 1	Mathematics	Whitney Boyce	Bedford County
Transformations	Mathematics	Lana Carlton	Bedford County
Writing Formulas	Mathematics	Anna Arnold	Cannon County
Deriving the Quadratic Formula	Mathematics	Norma Lewis	Cannon
Against All Odds	Mathematics	Stephen Blessing	Coffee
Numbers that Mystify	Mathematics	Dorothy Pedigo	Coffee
Circular Conics	Mathematics	Marylee Foster & Francine Whitworth	Rutherford
The Saga of SOH-CAH-TOA	Mathematics	Jim Miller	Rutherford
I saw the sign	Mathematics	Candis Angle	Wilson
Earth's Moving Plates	Science	Jeanie Phillips	Bedford
Chemistry Jeopardy	Science	David Harris	Coffee
Energy Flow Through the Ecosystems	Science	Joe Nunley	Rutherford
Careers	Guidance	Kris Marshall	Rutherford

Participants created a wide variety of multimedia projects. A few of the projects were primarily text-based stacks that simply presented information about a chosen topic in a linear fashion. Other projects incorporated diverse media (graphics, sound, quick-time movies, animations, etc.) and were highly interactive and nonlinear. Many of the projects included self-testing functions. In fact, the Chemical Jeopardy stack created by David Harris tested students' knowledge of basic chemistry using a "game-show" format. All participating counties were given copies of HyperStudio so that teachers could expand and refine their multimedia projects when they returned to their schools for the 1996-1997 school year.

Workshop Evaluations

At the end of the workshop, participants completed detailed evaluation forms. Eight-seven percent of the participants rated the overall quality of the workshop sessions as either "good" or "excellent." Sixty-seven percent rated the usefulness of the workshop to their teaching as "good" or "excellent." Participants gave their highest ratings to the software application training sessions, individual consultations with the instructors, open lab sessions, and the final participant presentations. They were less enthusiastic about the presentations concerning curriculum frameworks and the sessions demonstrating the digital camera and scanners. Participants complained that the camera/scanners session did not involve enough "hands-on" experience with the digital imaging equipment. Teachers were also frustrated by frequent computer crashes that occurred during many of the training sessions, crashes that were probably related to problems with the HyperStudio program.

Plans for Future Workshops

Plans are underway for conducting a second M.A.S.T.E.R. I.T. workshop during the summer of 1998. Some of the participants in the first workshop will return as master teachers and mentors in the second workshop. We will use the evaluations from the first M.A.S.T.E.R. I.T. workshop to improve the training and events planned for the second workshop.

[TOP]

University/Public School Keypals Project: A Collaborative Effort For Electronic Literature Conversations

Betty D. Roe, Ph.D.

Sandy H. Smith

- Introduction
- Background Related to the Project
- Description of the Project
- References

Introduction

The University/Public School Keypals Project was developed because a group of university and public school educators believed that it is imperative for technology to be integrated into today's classrooms. Currently students live day-to-day in a world saturated with technology. As adults they will face a society that will include greater technological advances. Since the goals of schooling include preparation for the future, the exposure to and integration of technology cannot be ignored.

Heide and Henderson (1994) conclude that today's varied technology has the capability of changing education. They suggest that the integration of technology into the curriculum will increase student learning and teacher productivity.

Background Related to the Project

The use of computers in the classroom has changed over the years. At one time, teachers used computers primarily as a means of providing individualized drill and practice or as expensive rewards for those students who mastered classroom content or completed assignments. More recently teachers have discovered the values of word processing, desktop publishing, database applications, spreadsheets, and a variety of management functions, such as grade book programs, as well as multimedia presentations, electronic mail activities, and Internet access for research. This project was designed to go beyond the lower- level applications and make use of more advanced strategies.

Effective integration of technology involves planning and knowledge of the curriculum, as well as technological skills. Many educators currently find themselves lacking in skill and knowledge when faced with the need to integrate technology into their classroom curricula. Grabe and Grabe (1996, p.20) state, "It is not uncommon to find them [teachers] nervous and reluctant to learn how to use technology." Barksdale (1996) indicates that many teacher preparation programs are lacking in instructional technology training. A critical challenge facing today's schools includes the training of teachers, both veteran and new in the field, in instructional technology. Tennessee Technological University (TTU) is committed to meeting these challenges, and faculty are seeking ways to do so.

TTU is fortunate in that it has received a special endowment that was used to increase the amount of

technology available through the course offerings in the College of Education. Both Macintosh and IBM compatible 21st Century Classrooms have been established to enhance the teacher education program. These classrooms were created to replicate those existing in the public schools in Tennessee. The instructor of the undergraduate reading methods course was very interested in the integration of technology in reading instruction. The content of that course was evaluated and revised to accommodate a project in which methods students would interact with public school students about literature through e- mail as an integral part of the course, thus giving the public school students one-to-one mentoring from the teacher education students and giving the teacher education students a chance to study seventh grade students' literacy skills.

Public school personnel are also interested in making the best possible use of technology. Steve Ketcham (1996, p.24) an elementary school principal in Baton Rouge, Louisiana, reports that one of his interview questions for prospective teachers is " What can you bring to our school in the area of technology?" Ketcham suggests that public school administrators use their hiring power to help set the priorities for teacher preparation programs. He also addresses the importance of working collaboratively with universities to influence how much priority is given to training in instructional technology. He indicates that many university courses are limited to only fundamental computer literacy skills and do not feature how to teach content effectively using technology.

The Overton County School system in Tennessee was eager to join Tennessee Technology University in a project that had the possibility of improving both programs. Planning for this partnership involved locating funding sources. Initial funding for the project was made possible through two sources. A special grant from the Tennessee Reading Association provided funds that were used to purchase the books necessary to implement the project. One copy for each participant was purchased. Additional funding from the University was made available to hire student help to monitor and assist the methods students in computer use.

The project was designed to serve approximately 80 University methods students and fifty public school students. It served Tennessee Technological University and Livingston Middle School in the Overton County school district.

The project was needed because the Upper Cumberland area is predominately rural, and many of the schools are far from the University, thereby making it difficult for them to benefit from the resources brought into the public schools by practicum students taking methods courses, as is possible for the nearby schools. Overton County Schools are far enough away from campus to make sending practicum students there regularly unworkable. TTU professors also often have a problem finding enough practicum placements for the volume of students in their teacher preparation programs. Having some of the application of theory to practice be accomplished through Internet connections enriched the University's teacher preparation programs. This, in turn, should enrich the public schools of the area, since a large number of the University's teacher education students take teaching jobs in the area.

The students in Overton County had shown a need for improvement in writing skills, as indicated by the results of the available standardized tests. This project was designed to involve the students in purposeful writing for an attentive audience. The audience would also provide feedback to the students. The writing would have focus, and the students would be motivated to write clearly because they wanted to be understood. Using literature as the main focus of the writing would expose the students to literature selections to enrich their language learning and serve as good models for their own writing. The project directors hoped that these activities would result in improved student achievement in the area of language arts.

At the same time this project was being planned, others were trying out similar ideas. Albaugh (1996)

reported a collaborative project that provided an "authentic context" for incorporating technology into the curriculum. The keypal e-mail project involved 21 fourth-grade students and 18 university students enrolled in an elementary methods course. The weekly discussion groups centered around a common literature selection, *James and The Giant Peach* by Roald Dahl. The experience benefited both participating groups and further encouraged efforts to integrate technology into existing K-12 classrooms in the area surrounding the University.

Wax (1996) describes a collaborative effort between a high school history class and the University of Michigan. The project used electronic mail to link the two groups. Wax (1996, p.2) reported, "We are not just word processing, we are engaging in discussions, reading and responding to each other's work, and communicating with others." The impact upon the history curriculum was that the project integrated the past with the present and created a highly motivational learning environment for the students.

Gillis (1994) described the overall success of a collaborative writing program, Writing Partners, that was similar to the TTU/Overton County Keypals Project. In the Writing Partners project eighth grade and university students were paired and corresponded with each other during one semester using regular mail. The benefits of the collaborative partnership included the development of the students' positive attitudes toward writing. Gillis also reported the project's impact on how the students began to view themselves as writers. The opportunity for writers of different ages to exchange correspondence helped the younger writers to understand the purpose of writing as a real-life communication skill.

In an effort to link urban and rural schools through the information superhighway, the Kentucky Telecommunications Writing Program (KTWP) implemented an innovative approach using technology in a meaningful way (Bell, Cambron, Rey-Barreau, and Paeth, 1995). In the KTWP, schools across the state of Kentucky were connected through the use of technology in the writing curriculum. The students posted messages about a variety of literature selections and received written responses from other students. Discussions based on core concepts in several subject areas were also conducted, and research opportunities for the classes were enhanced. The team of teachers participating in the online literature groups summarized the experience this way: "This tried and true lesson plan caused more excitement over student-read novels than we have seen in years" (Bell, Cambron, Rey-Barreau, and Paeth, 1995, p. 1). The benefits of the project included contagious enthusiasm and an increase in critical thinking skills, as well as enhanced knowledge of literary elements. The participating teachers recommended the strategy to others.

Description of the Project

Partially based on the findings of projects like the ones described above, a group of University faculty and staff and public school personnel decided to devise a computer-based project that would be beneficial to both the University and the public school program. This project was to involve the collaboration of the Overton County School System with TTU in a program designed to engage seventh grade students and TTU students in the use of 21st century technology. Seventh grade students enrolled at Livingston Middle School used electronic mail to interact with TTU Teacher Education students enrolled in READ 330, Teaching of Reading, and with several graduate students in reading/language arts methods classes. The e-mail interchanges included discussion of a literature selection, *Bridge to Terabithia* by Katherine Paterson, that the two groups were reading on the same preplanned schedule and both groups' reactions to a video of *Bridge to Terabithia*. The seventh graders also made use of technology by producing a multimedia mPOWER presentation, based on the book, as a culminating activity.

The project was designed to impact the language program by using technology to prepare students for the 21st century. The use of electronic mail was an innovative approach to distance learning for both populations. Through this medium, technology was integrated into the curriculum in order to optimize learning. It made more effective use of 21st century classroom materials and equipment and multimedia

presentation software. Perhaps the most beneficial aspect was that it provided a more meaningful purpose for reading and writing.

The project met several objectives for the public school students. The high-quality literature selection provided a model for the students' writing. The interchanges provided an authentic audience for student writing, resulting in more care on the part of the seventh graders in their written communications, and encouraged the students to use higher level thinking skills. Their e-mail communications about the literature reflected thinking on all levels of Bloom's Taxonomy. The individual attention received by the seventh graders enhanced their self esteem. Their self esteem was also enhanced by mastering the necessary technical skills to produce the e- mail interchanges and the multimedia presentation.

The project also met several objectives for the University students. It prepared the University students to apply 21st century technology in the classroom through the use of e-mail and discussion groups. It allowed them to learn more about seventh graders, an age group that many elementary majors are not exposed to in their preparation program, although their licensure covers this grade level, and it gave them an opportunity to serve as mentors for the students. It also caused them to read appropriate literature for the grades they might be teaching.

The teacher education program at TTU benefited from the authentic utilization of technology in the methods courses, accomplishing the application of theory to practice. The approach enriched the preservice and inservice program while also meeting the needs of the public school students in the area surrounding the University. It offered a supplementary experience to the traditional school practicum placements for preservice teachers and allowed them to work with students who might otherwise be inaccessible due to distance. It provided an opportunity for all students to work cooperatively to think more, read more, and write more.

To initiate the project, the participating seventh graders composed letters of introduction to the University students. These letters, along with pictures of the seventh graders, were sent to the University coordinator for the purpose of establishing the keypal partnerships. Partners were matched, insofar as possible, according to interests that they shared. Once the matches were made, the first messages sent through e- mail were the letters of introduction from the TTU students to their seventh grade keypals.

During the next seven consecutive weeks, both groups of students read the assigned book on a predetermined schedule (one or more chapters each week) and e-mailed their partners about the specified chapters. The University students also had an opportunity, during this time, to post to a discussion group about the literary elements in the novel being studied. However, there were two major disk crashes, causing loss of postings and frustrating the participants. The students did all post to the discussion groups four times during the semester, but the difficulties encountered with this component of the project caused it to be discontinued the next semester.

During the ninth week both groups watched a video of the book and e-mailed comparisons and contrasts of the book and video to each other. Both groups considered possible reasons for the differences in the video and the book. Many reported that the video did not have enough details and reacted strongly to changes that they described as those taking place "for no reason at all." Both groups reacted negatively to the merging of two school teacher characters into the one character featured in the video. The public school and University students also discussed at length a change in the ending of the video presentation, as compared to the book, which they thought was unwarranted. The exchanges provided evidence of analysis and evaluation resulting from the comparisons and contrasts.

The University students also viewed the mPOWER presentation about the book that the seventh graders

had created. This presentation was implemented to provide another way to involve the students in meaningful use of technology.

In developing the mPOWER presentation, the seventh grade classroom teachers organized cooperative groups and established a schedule for group assignments. Each group designed a rough draft reflecting its ideas. Once the group refined its ideas, students used the computer to create the desired effects. The mPOWER software enabled the students to incorporate audio and video elements in the creation of their multimedia presentation. The mPOWER program consisted of a series of carefully crafted sequenced slides which featured main ideas from the book, as well as events and characters. Student-created drawings, photography, and selected music provided the format for a powerful presentation.

During the tenth week, the partners met face-to-face and discussed the overall experience. Evaluative information was collected from both participating groups. The participating public school teachers responded favorably and expressed a definite interest in continuing the project. They felt that the value of the program was reflected by the reaction on each seventh grade student's face when the teacher looked at him or her and said, "You have mail!" They reported that the project provided the ideal experience for integrating cooperative learning, communication, technology, and thinking skills. Both the university and public school student groups responded positively to the experience. Many of the keypals continued to send e-mail to one another, even after the end of the semester.

The Fall 1996 semester featured *Bridge to Terabithia* by Katherine Paterson as the literature selection. The Spring 1997 semester is featuring *Tuck Everlasting* by Natalie Babbitt.

Throughout and at the conclusion of the first semester of the project, both formative and summative evaluative information was collected. The seventh grade teachers, along with the University coordinator and the liaison between the University and public school personnel met to discuss the schedule and the activities and to make revisions as needed. The participating University students, both graduate and undergraduate, composed evaluative summaries of the experience and suggestions for future implementation.

Plans for the future of the project involve expansion in both the public school and University areas. The University coordinator is exploring the possibility of including other methods courses in the interchanges. The liaison is currently working directly with other public schools in Overton County to determine availability of resources and interest. There are tentative plans to include four third grade classes, approximately 100 more students, in two different Overton County schools when the project is initiated next school year.

The effectiveness of the first phase of the program was reflected in comments collected from the evaluative summaries of the TTU students. One wrote, "This particular project not only introduced students to a good piece of lit

The Future of Teacher Education: Students, the Web, and the Teaching and Learning Process

Dorothy Valcarcel Craig

- Abstract
- Paper
- Assignments
- References

Abstract

Technology is changing at a rapid pace. As these changes occur, the field of teacher education must modify instruction in order to prepare students for the future. With the ConnecTEN Project in Tennessee, Internet access has been made available to educators across the state. According to Robin, Keeler, and Miller, the World Wide Web has changed from being a refuge for only computer scientists to being the most talked about and highly promoted technology in the world (1997). If teacher education students are not aware of how the World Wide Web can enhance teaching and learning, they will be a step behind at the crucial time when they begin to seek employment. To prepare future educators and help them become prime candidates for employment, universities must assist students in developing the skills needed to navigate the web. In addition to navigation skills, university students who will be the future educators must also acquire the knowledge and skills needed to successfully integrate, enhance, and infuse their curriculum with quality materials which are easily accessible through World Wide Web navigation.

Teacher education programs at universities across the country are requiring students to enroll in courses related to educational or instructional technology. Many of these courses offer instruction in World Wide Web navigation, homepage construction, and designing technology-infused lesson plans. Professional organizations such as NEA ad NCATE support courses in educational technology. The idea behind this movement is to create a team of future educators committed to four major classroom practices. Milone (1996), suggests these key practices include:
building expertise in using new technologies sharing expertise with colleagues using this technological expertise with students on a daily basis working towards the common goal of making classroom technology available to all students.

The expertise to implement sound technology practices begins at the undergraduate level. It is in the preservice technology classes that students begin to acquire skills in using new technologies. As their coursework progresses, students engage in sharing this expertise with their fellow students. Teacher education programs that include spiraling courses in educational technology foster this newfound knowledge and enable students to continue to build the skills and awareness they will need out in the field. For example, throughout a teacher education program a student may be required to take a beginning course in educational technology. Requirements for this entry level course may include proficiency in operating equipment, developing HyperStudio stacks, designing technology-infused lesson plans, World Wide Web navigation, and beginning homepage construction. The World Wide Web plays a significant role in entry level technology courses.

Guiding and allowing students to strengthen World Wide Web navigation skills opens up countless

opportunities for preservice students. If students develop the necessary navigation skills to travel with ease and seek out information on the web, their future classrooms will be enriched beyond the walls of local schools. Ability to navigate and search for information on the web will empower students with a valuable tool that will assist them in other preservice courses. Later in the student's program, a required methods course may pick up where the entry level technology course left off. The methods course requirements may include; 1)design of a telecurricular, integrated unit of study, 2)creating a telecurricular telecommunications project, 3)posting lesson plan ideas to a homepage, and 4)writing telecommunications simulations. On-line field trips, finding educational news and information, accessing lesson plans and ideas from the university classroom will help students master the monumental task of instructional planning and curriculum design (Robin, Keeler, & Miller 1997). University professors who incorporate World Wide Web sites into their lessons by having students visit referenced sites or engage in web searches to compliment lesson material help students advance their skills and uncover a much needed relevance to what is going on in the field. For example, designing an on-line classroom simulation would be a difficult task for the student who had never experienced this type of activity. However, employing the World Wide Web to reveal examples would make the task enjoyable and interesting.

Assignments

Simulation Assignment

Design a simulation that will compliment your integrated unit. Follow the plan below. Your assignment must be typed and turned in on the specified date. Remember that a simulation must teach some aspect of the world or environment. Players must experience and imitate a real-life situation.
How to plan a simulation:
1. Explore your subject area and decide on a common situation
2. Identify your objectives - select these objectives from your integrated unit material.
3. Define the simulations scope - answer the question, what do you plan to accomplish Describe the simulation situation.
4. Construct a set of rules that students will follow throughout the simulation.
5 Summarize what will be taught in order to prepare the students for the simulation. This should encompass what students will need to know beforehand - content, concepts, skills.
6. Identify the roles of participants - answer the question, what will students be doing For example, managing a baseball team, running a bank, playing the stock market.
7. Describe the daily routine that will take place.
8. Outline the initial student simulation orientation - your introduction to the simulation. Introduce the students to any record keeping material that will be needed for simulation activities. For example, a stock portfolio, management log, journals, ledgers.
9. Develop a debriefing - design three analytical questions that will be discussed during the debriefing.

Sites to check for examples:
LegiSim - http://student.ecok.edu:80/~polsci/faculty/julrich/courses/1113sim.html
Electronic United Nations - http://www.simulations.com:80/eun/overvie.htm
Project ICON - High School Simulations - http://www.bsos.umd.edu/icons/mhs96.htm
Global SchoolNet Homepage - http://www.gsn.org

Curriculum design tasks and lesson planning can be both confusing and frustrating to the preservice education student. Most education majors have the desire but lack the expertise and depth of knowledge needed to plan an integrated, technology-infused unit of study. Curriculum integration can be extremely problematic to the student who is in the process of mastering material in one discipline. Providing students with on-line examples via the web can help students make sense of an otherwise complicated concept.

Assignment

BEST COPY AVAILABLE

When planning integrated curriculum units, its always good to have an example. There are many examples of integrated curriculum units available on the World Wide Web. Use Netscape to access the following sites as resources for integrated curriculum planning:

Heidi Hayes Jacobs Model:
http://edweb.sdsu.edu/courses/edtec596/Units/UnitsIndex.html
Seeds Project - http://science.stark.k12.oh.us
Integrated Science at University of Alabama - http://www.sa.ua.edu/sa/ccet/is.htm
Group Work:
Using class information regarding integrated curriculum models, access the first web site and examine the following units:

Group 1 - Family Unit
Group 2 - Leadership Unit
Group 3 - Responsibility Unit
Group 4 - Space Unit
Group 5 - Media & Behavior Unit

Analyze the units for content and format. Answer the following questions - be prepared to present your findings to the class.

Questions to think about:

Is the unit content appropriate for the suggested grade level? Explain.
Does the format fit the model? Explain.
Is there enough depth in the planning to span at least six weeks of teaching? Explain and provide examples.
Are the selected activities appropriate developmentally? Explain and provide examples.
How would you improve the unit you examined?

Required courses in teacher education programs that are designed to provide a continuum and that provide students with access to the World Wide Web offer students the connections they need to internalize their learning and develop the technological expertise to put them in the forefront of the professional job market.

Most teacher education programs steer students on a beginning path to classroom technology. However, several universities are creating learning communities with public schools. One such program described by Leach (1996) involves elementary and secondary schools partnering with a university. This "Open University" concept encourages preservice students to move from observing and working with experienced teachers toward teaching on their own. The program goes one step further by providing every student and teacher participant with an Apple Macintosh computer, modem, and printer. The computer with on-line access enables students to correspond in a flexible mode with professors and teachers in the field (Leach, 1996). The future of teacher education lies in the integration of technology into preservice coursework. University professors who model instruction infused with technology offer preservice educators a replica of teaching than can and will be reproduced in classrooms of the future.

References

Leach, J. (1996). "Teacher education-on-line!" Educational Leadership 54, 68-71.
Milone, M. (1995). "Electronic portfolios: Who's doing them and how?" Technology and Learning v. 16, n. 2, 28-36.
Robin, B., Keeler, E. & Miller, R. (1997). Educators Guide to the Web.
New York: Henry Holt & Company.

On-line References

BEST COPY AVAILABLE

http://edweb.sdsu.edu/courses/edtec596/Units/UnitsIndex.html
http://www.sa.ua.edu/sa/ccet/is.htm
http://science.stark.k12.oh.us
http://student.ecok.edu:80/~polsci/faculty/julrich/courses/1113sim.html
http://www.simulations.com:80/eun/overvie.htm
http://www.bsos.umd.edu/icons/mhs96.htm

[TOP]

Macintosh Internet Server Implementation

Mike Baker

Carolyn Walsh Carter

Dennis Lutero

Jackie Meese

Suvit Nopachai

Maurya L. Schweizer

Jeff Stuart

David Carter-Tod, Graduate Assistant

- Abstract
- Introduction
- Prerequisite Skills
- Hardware and Software Needs
- Objectives of Assignment
- Instruction Received
- Design of the Web Site
- Creation of the Web-based Instruction
- Presentation of Materials
- Classroom Considerations
- Technical Problems Encountered
- Conclusion

Abstract

This paper describes a classroom activity which consists of setting up an Internet server and developing web-based instructions for the server set up. This instructional process would be useful to instructors planning to teach similar material. The web-based materials serve as a reference and a tutorial (http://www.aca.vt.edu/webspinners/webserv.html) to complement that instruction. The web-based tutorial contains six modules: Web Server Setup, Web Server Security, FTP/Gopher Server, AppleSharing, E-Mail and Mailing List server, and CGI Applications. The paper describes course administration, including: pre-requisite skills, hardware and software requirements, objectives, instruction received, design of the web-based tutorial, classroom considerations, and technical problems encountered.

Introduction

This project as developed as a requirement for EDCI 5774: Advanced Telecommunications, an intensive eight day seminar, which was held July I - 10, 1996 at Virginia Polytechnic Institute and State University. The class was composed of master's students, doctoral candidates and classroom teachers with widely varying skill levels in computer usage. Based on a HTML/basic computer survey, the most

highly proficient students were selected to participate in advanced instruction to set up and maintain a variety of Internet services.

Prerequisite Skills

The six students selected all possessed the following competencies:

1. Skilled in either a Windows-based or Macintosh environment

2. Basic skills in developing HTML documents

3. Basic skills in Netscape/web browsing and search engines

4. Familiarity with Internet concepts such as e-mail, listservs, ftp/gopher services, downloading and telecommunications terminology.

5. Familiarity with concepts of network topology

Hardware and Software Needs

Although the project was developed on Power Mac 7500/100s, the minimum hardware requirement is Macintosh running System 7 with a 68030 processor and a permanent Internet connection. The software used to set up the Macintosh Internet Server consisted of shareware used only for the duration of this project and freeware downloaded from the Internet.

Objectives of Assignment

1. Individually implement an Internet server consisting of web server, ftp and gopher server, mail and list server and Common Gateway Interface (CGI) application in a Macintosh environment.

2. Design and develop a web site to deliver instructions for setting up an Internet Server.

Instruction Received

The Internet server group received instruction in setting up Internet web servers from David Carter-Tod, the graduate assistant responsible for maintaining the servers for the College of Human Resources and Education at Virginia Tech (http://www.chre.vt.edu/). This instruction was delivered via demonstration followed by hands-on instruction over a five day period.

Objective 1 - Each student was assigned to a Macintosh workstation and set up their own web server on that workstation. This was accomplished by demonstrations followed by hands-on guided practice for each element of the Internet server. The students downloaded shareware programs from Macintosh ftp archives to use as the server programs. The programs downloaded were:

MacHTTP 2.2 - web server

NetPresenz 4.0.1 - ftp and gopher server

Macjordomo 1.0SbS and AIMS 1.1 - mail and list server

A CGI application Count Webula 1.2 - a program which counts hits on a web page.

Objective 2 - The process of setting up an Internet server was broken down into six parts. Each student was responsible for writing the HTML document explaining how to implement a particular part. The parts were as follows:

1. WEB SERVER SETUP: The basics of web server installation, set up. and maintenance, using

MacHTTP 2.2

2. APPLESHARE/USERS &GROUPS SETUP: The basic setup procedures for the AppleShare/Users & Groups features in the Macintosh Control Panel, which are ital to file security when running an ftp or gopher server.

3. WEB SERVER SECURITY: The various ways of ensuring security for web sites, including userid/password identification and separate web servers for restricted access areas, using MacHTTP2.2.

4. FTP/GOPHER SERVERS: The basics of ftp/gopher server installation and set up using NetPresenz 4.0.1.

5. MAIL/LIST SERVERS: The basics of mail and list server installation. set up, and maintenance, using Apple Internet Mail Server (AIMS) and Macjordomo. Discusses the interrelationship between these two applications and how they work together.

6. CGI (COMMON GATEWAY INTERFACE APPLICATIONS): The purpose and use of CGIs, including how to acquire and set up a counter CGI.

Design of the Web Site

After the third day of instruction, the students met as a group and assigned a leader/coordinator for the project. At this point, web server development was di ided into six units and each student took responsibility for designing the HTML document for a unit. It rapidly became apparent that a standard format was needed to insure visual continuity and consistent links between the units. The students met again as a group to standardize the document.

Standard file naming system

All students were given rights to a common "Webspinners" folder on the server in which to store their work. A file naming system was developed to insure that no files were accidentally overwritten. As the project developed, a separate folder was created for graphics. Initially, for ease of access and because of server instability due to high usage, students chose to save their work on their own workstations and/or floppy diskettes and ftp it to the server for testing and final compilation.

Introductory page

The students decided an introductory page was necessary to provide an overview of each topic and link to the student's personal homepage as part of the overall course requirement.

Unit titles

The students assigned short descriptive unit titles to each section in order to maintain consistency across units and to create uniform navigational links. These titles were listed in Objective 2 above.

Visual Format

The students created visual consistency between units by standardizing wording. font type and size, and horizontal rules on the top and bottom of each page.

Credits and "mailto " address for each section

Each individual unit contained the author's name with a "mailto" link for receiving comments on the unit.

Frames

A sub-objective, part of the regular course requirements, for each student was the inclusion of a frame in their HTML documents. The group chose an opening frame used to navigate between sections of the instruction to furfill this requirement.

Navigational links

Textual links were established at the bottom of each page to alleviate navigational problems for users Nvith browsers which do not support frames.

Creation of the Web-based Instruction

A requirement of the class was that HTML code be entered manually without the help of an WYSIWYG editor. Netscape was used as the browsing program to view HTML documents and test links. Students downloaded materials such as graphic files, and FlashIt, a utility used to capture screen images, which were subsequently used to illustrate the instruction. In addition, students browsed the Internet for supporting documentation to include as hot links in their respective sections.

Presentation of Materials

Classroom presentation

The students presented the web-based instructional materials in a two-hour session to the entire Advanced Telecommunications class. Each student presented his/her own section and described the steps involved in implementing the Internet server.

Electronic poster session

The opening screen of the original document has been redesigned for a more professional appearance for presentation at the electronic poster session of the Mid-South Instructional Technology Conference, Mufreesboro, TN, April 6 - 8, 1997. Links to the student's personal homepages have been removed. The frame has been redesigned and the closing credits have been mod)fied to include the names of the graduate assistant, David CarterTod, and Suvit Nopachai, an unofficial class member and the Macintosh troubleshooter for the group. The mailto address at the bottom of each page has been changed to a common listserv address to which all members subscribe.

Classroom Considerations

The division of the class into server and regular groups was beneficial to both groups. The beginning group benefited from the presentation and materials developed by the server group and the server group was free to explore more advanced telecommunication features. While the basic concept and instruction were excellent, there were several instructional considerations for future implementation of the project:

1. There was no presentation equipment available for demonstrating setting up the server. This was primarily because the beginning group was as using the classroom which contained the presentation equipment.

2. There was little planning or practice time between the instruction and the web -page development. a common problem in intensive summer courses. This problem was offset to a certain extent by the lab hours 8:00 AM - 11:00 PM, and the availability . Of the instructors during most of this time.

3. Due to the inchoate nature of the web server project, handouts and instructional materials were unavailable to the group and instructions were mainly verbal. Another rationale was as that the instructor felt that the net resources available to the students were far more copious than anything he could provide. The web site developed by the group could serve as a resource to future classes.

4. The server group was as expected to complete all assignments given to the regular group as well as the server implementation and web pages. This required the students to rapidly shift between the

instruction and assignments the regular students were given and their server assignments, fragmenting their efforts and causing a lack; of concentration and lack of cohesiveness within the group.

Technical Problems Encountered

A few technical problems were encountered during the week.

1. The server group should have used separate folders for each unit/group member within the "W ebspinners folder on the server to protect against accidentally overwriting files and for organizing the project.

2. Many of the archive sites necessary for setting up the servers were inaccessible or v very slow due to traffic.

3. The college experienced a major hardware failure for a short period of time and only a limited number of connections could be made at once.

Conclusion

Tools for managing and maintaining Internet services are evolving rapidly, and more recent versions of the software mentioned in this paper already have been released. However, we believe that the basic services, the client-server model, and the underlying instructional model described here will ill not change so quickly. Much was learned from the hands-on nature of the course. The consensus of the group was that the project was beneficial and would be worth replicating in future classes.

[TOP]

The Readers' Advisory in Academic Libraries

Virginia Vesper

- The Readers' Advisor in the Academic Library
- Web Site Examples
- Works Cited

The Readers' Advisor in the Academic Library

Librarians have always wanted "to provide the right book for the right reader at the right time (Drury1), and the Readers' Advisor has a long tradition of finding that "right book" for the "right reader." The name itself is defining, the Reader's Advisor or Advisory counsels and guides readers or library patrons to needed information or just a good book to read. The definition has, at times, included reference service, but most often the term is used to describe a service for guiding the reader to recreational reading.

The idea for a Readers' Advisor originated with public libraries in the 1920's and spread to academic libraries, where the importance of reading for intellectual development as well as for recreation was recognized. The creation of a browsing area, complementing the Readers' Advisor service became an important element of the academic library in the 1930's. An excellent article by Janelle M. Zauha discusses the early history of browsing rooms, particularly at the University of Iowa. She quotes John B. Kaiser, Director of the University of Iowa Libraries from 1924-27, about the importance of reading and a browsing room. "The Library suggests to the student that he take time each week to read books on some subject entirely outside his regular work: that he make the acquaintance of some of the standard magazines never before encountered....that, above all, he learn to know books as friends and to experience the sheer joy of reading"(Zauha 57). Often these browsing rooms were staffed by a librarian, a Readers' Advisor, whose function was not only to select and maintain the collection, but to provide "the right book to the right reader at the right time." The objective of the browsing collection has remained the same through the years, "to stimulate, entertain, relax; to offer readers the newest attractive books on hobbies, travel, and other personal recreational activities; to entice people into subject areas as yet unexplored by them (Shelton 410). Library literature of the 1930's includes numerous references to browsing rooms in college libraries, dormitories and fraternity houses, as well as articles encouraging Readers' Advisor services for both academic and public libraries.

In the 1940's the popularity of this service declined, at least as a formalized position or policy. For academic libraries, the death knell came from Harvie Branscomb, Director of Duke University Libraries who published a book in 1940 entitled, *Teaching With Books: A Study of College Libraries,* which was the result of a study investigating the role of the library in undergraduate education. Branscomb believed that for students "there will be little time for outside reading....The college library, it can be argued, needs to take its own task more seriously, not to attempt the role of the public library, the great concern of which with recreational reading is itself questionable"(qtd. in Farber 4). So, after a brief moment of glory in the 1930's the Readers' Advisor in academic libraries became only a memory. Browsing rooms continued to exist but without a librarian to assist students.

With some notable exceptions, the Browsing Room has been tolerated, but not usually encouraged, in academic libraries. At the University of Illinois, the Illini Union Browsing Room has survived, but even this collection only survived because external funding came to the rescue in 1991. Other exceptions are the University of Indiana and the University of Michigan which have residence halls that serve as learning centers, encouraging the expansion of intellectual and cultural development. Based on the

premise that reading and libraries are vital to life-long learning, each residence hall has a library. These libraries have a variety of knowledge-based resources including reference as well as recreational titles, and at each library, a Head Librarian, a graduate student from the School of Information advises students with the help of a team of Library Assistants.
Browsing rooms, the "Cinderella" of academic library services have been virtually ignored for several decades. A survey done by Susan Marks in May, 1975 of the nations's thirty largest university libraries had 24 respondents. Only twelve of these responding libraries still had browsing collections (95). Possible reasons for the decline in this service include open stacks, shrinking funds for library resources, the information explosion, and the love affair with technology. Given the current financial crisis on most campuses, the emphasis on accountability, and the constant struggle to meet the curricular needs of the academic community, spending funds for recreational reading seems like buying cut flowers for a dinner table centerpiece when you don't have enough money for the entree. Time, money and staff have been in short supply for a text-based service deemed marginal or non-essential to the college community.

Librarians have rationalized the existence of browsing collections, in times when expenditures on this type of material might be criticized, and have sought inexpensive and imaginative methods of supporting acquisitions to this collection by buying paperbacks, accepting donations, using book sale funds, rental plans, lost books from airports, etc. A common practice and solution for many libraries is to temporarily shelve selected new additions to the collection in the browsing area.
Many librarians, who are readers and bibliophiles, see the advantages of "encouraging recreational reading, which in turn can increase general and specific reading interests. At a time when headlines warn of the decline in college students' ability and desire to read, the existence of browsing rooms should not be jeopardized, but encouraged"(Marks 95). Alan Bloom in the *Closing of American Mind* laments "our students have lost the practice of and taste for reading. They have not learned how to read, nor do they have the expectation of delight or improvement from reading"(62). Three studies in the 1980's, reported in Zill's *Who Reads Literature?,* point to a decline in reading by young adults in the United States (19). Two of these studies were sponsored by the Book Industry Study Group and the third study, Survey of Public Participation in the Arts was sponsored by the National Endowment for the Arts. Studies site a variety of reasons for the decline in reading interest and ability (Zill). In a presentation concerning the reading habits and abilities of college students at the International Reading Association meeting in 1988, Evan Farber hypothesized that two of the possible reasons for the lack of reading among college students were that academic libraries do not encourage recreational reading and that many students suffer from "library anxiety" which causes them to avoid the library unless absolutely necessary (2). The Browsing room and a Readers' Advisory Service seems an obvious
remedy to this situation, and in the past was recognized as instrumental in encouraging reading. In 1936, Professors Randall and Goodrich writing about browsing rooms in the *Principles of College Library Administration,* stated, "The amount of free reading done in a college will be commensurate with the supply of material of a readable nature which is furnished and with the ease with which it may be secured. Any activities, therefore, which result in increasing the supply or the accessibility of readable and interesting books are likely to be useful in the encouragement of reading" (151-152). The influential author of *The Administration of the College Library,* Guy R. Lyle devotes a whole chapter to encouraging reading, especially recreational reading in the 1949 edition of this book. He includes a most impassioned plea and defense for recreational reading and a readers' advisor from a former president of Brown University, Henry M Wriston.

```
In a large and more genuine sense, however, recreational reading is often the most
truly educational, even the most really intellectual, element in experiences with
and through books. It may well furnish an intellectual project within which the
student establishes his own goals and determines his own significant values. It is
the place where his tastes, aptitudes, and skills find freest play. Individual
differences, recognition of which is the keynote of modern education, here come to
richest fulfilment. It is precisely through independent reading that the task of
knotting together the raveled sleeve of information may best be achieved. Here the
student's own philosophical structure takes form as a result of reading and
reflection. A shrewd and wise person, who knows the student and has the gift for
offering stimulating suggestions, makes as direct and profound an impact upon his
development, as any professor, of whatever degree or distinction ( qtd. in Lyle
246).
```


BEST COPY AVAILABLE

While browsing collections have survived, the readers' advisor has seemingly disappeared from academic libraries. The vestigial remains can only be glimpsed in the division of books into genre categories, displays of books for special occasions, or bibliographies. Although there has been a renewed interest in Readers' Advisory in the public libraries during the last decade, this interest has not yet appeared in academic libraries. But there is a glimmer of a resurgence of interest in browsing collections and readers' advisory services in discussions on academic library listservs. Perhaps as a backlash to the impersonalization of technology, a renewed interest in reading, book arts, and book discussion groups is taking place. Ironically, libraries and librarians, using the same technology that many feel is in direct opposition to reading and literacy, are providing inexpensive Readers' Advisory services to their patrons.

Public Librarians have been actively exploring the use of the Internet for providing such services. An example is the Mid-Illinois Readers' Advisory Group (MIRAGe), which is a group of librarians who are interested in developing their Readers' Advisory skills and in promoting literature and reading for pleasure. MIRAGe was formed as the result of an October 1993 meeting. Those librarians in attendance expressed interest in forming a group in central/mid-Illinois to provide practical programs, bibliographies, and networking opportunities for librarians working with adult fiction readers' advisory services. Another example is the sophisticated tool for online Readers' Advisory that has been marketed by the CARL Corporation since 1994. NoveList is an electronic readers' advisory resource which provides subject access to more than 34,000 adult fiction titles and more than 6000 full text book reviews. An excellent overview of how the Internet can be used for Readers' Advisory has been written by Roberta S. Johnson from the Morton Grove Public Library. This article describe how the Internet can be used for Collection Development and answering specific questions from patrons about books.

More and more public libraries are using the Internet web sites to provide Readers' Advisory services to their patrons. One of the best examples of a good site has been developed by two librarians, Janet Lawson and Cynthia Orr. In their own words, they describe *Book Browser*. "*Book Browser* is a collection of fiction reading lists. . We arrange our lists by genre, location, series and anything else we can come up with. The Reading Lists are the core of our site. and are designed to help avid readers locate new books to read. We have tried to combine the browsing quality of the old card catalog with the flexibility and efficiency of the Web. The lists are updated virtually daily, which is one of the wonderful things about the Web!" Although presently there are no annotations for the individual books, the lists are such that a reader can find a mystery about a librarian, set in Tennessee or an herbalist in Texas, and thereby the reader can make a decision about whether the book will be a good choice. *Book Browser* is an excellent site because of the amount of information presented, the pleasing graphics and logical layout, the additional links to other relevant Internet sites, and the provision for reader input. A library site in New Zealand, has a less comprehensive yet unique presentation for advising readers, based on the premise "If you like.....,try...." Although the layout is unimaginative, the lists are inspired, suggesting titles for both books and music, based upon what the reader already knows and likes. A library may decide to include only links to other sites on a Readers' page, an example is the *Readers' Services* page from the Rochester Hills Public Library. Their *Site for Book Lovers* includes links to book reviews, genre sites, author interviews, and other sites that library patrons would find valuable in obtaining further information about favorite books or authors. Or, a site may include only annotated lists of what is available in their library, such as the Normal Public Library's *Good Reads*. Ideally, the best site should include lists of individual titles with annotations as well as links to Internet sites, such as the Morton Grove Public Library site which is " Dedicated to the lover of fiction and fiction collections..." At the Morton Grove Public Library, the Reader's Service staff offers many special services to library patrons and on-line visitors such as an annotated list of selected new books, annotated bibliographies on many subjects fiction and non-fiction, a list of coming bestsellers, and links to other book sites on the Web. A variety of different web sites for Readers' Advisor services have been developed by public libraries to serve library patrons. Although some may be more inclusive or comprehensive than others, all should be applauded for the time, effort, and imagination needed for the creation of a web site.

The interest in providing Readers' Advisory services for public libraries is understandable since one of the primary functions of the public library is to provide recreational reading for library patrons; however, for academic libraries, where the provision of recreational reading is usually an auxiliary function at best, there has not been the same interest in providing this service. Academic libraries can create web

sites, similar to the ones used by public libraries to direct students to titles in their own library, while at the same time linking them to other information about the author, similar titles, and reviews. By using the Internet, academic libraries have the opportunity to support the recreational reading interests of the college community. An example of an academic site which concentrates on only one genre is the Romance Novel Database by Christina K. Powell. Created when she was a student at the University of Michigan's School of Information and Library Studies, this sites functions as both a readers' advisor and a source of information about books and authors in the genre of romantic fiction. Currently their are over 234 records in this remarkable resource with most having annotations and/or reviews, and an image of the book cover. Another interesting use of the Web for recreational/academic reading is from the Busse Center Library at Mount Mercy College. Their *Newsstand on the Web* is an innovative and useful service for obtaining information from newspapers, journals, and other informational media. One of the ways in which academic libraries are using the Internet is by creating a virtual browsing collection of new books and/or best sellers added to the library collection, as either a complement or substitute for a browsing collection. Examples include sites at the DeVry DuPage Library in Illinois, Grinnell, Cornell University, and the Middle Tennessee State University Library. Most libraries include only a brief bibliographic entry with a call number on their listings of new books. Cornell University's *New Book Shelf,* not only lists the new books, but has linked each title to the book jacket cover and the table of contents. The MTSU Library includes links to book reviews or information about the author to its listing of new titles. Most academic libraries give only a cursory nod to recreational reading even in the virtual library; an example is the library page from the University of Missouri at St. Louis which only lists a few Internet resources, related to leisure reading. *Dollies' Corner* is a virtual reading room at Northwestern University with a list of recent leisure reading and links to recreational Internet sites. The *Browsing Page* from the University of South Carolina has lists of popular titles and new selections, with plot summaries or short comments. The *Readers' Advisory* at Middle Tennessee State University is another virtual browsing room with bibliographies, links to Internet sites, and related information for recreational reading. Academic libraries are just beginning to take advantage of the opportunity to encourage recreational or leisure reading by using the Internet to create virtual browsing rooms for their students, and at present there are not many examples. In the absence of a browsing collection in the library, a web site can provide information on the availability of popular fiction and best sellers in the library collection. Additional information such as annotations, book reviews, or information about the author are easily linked to the site. Links to other Internet sites for the various genres, authors, reviews, and book discussion groups allow students to discover other titles or authors of interest. By using the Web in this manner, academic libraries can still acknowledge the importance of recreational reading to the college student.

However, the primary mission of academic library is to support the curriculum of the college or university, and this is reflected in the readers' advisor in an academic setting. "The function of the Readers' Advisor in the college library is to relate the student's classroom reading to appropriate readings, to guide his non-curricular reading, and thereby to broaden his base of knowledge"(Lyle 243). Although the position of Readers' Adviser in the academic library disappeared decades ago, reference librarians, particularly those involved with library instruction have been providing this service on a daily basis, not only by answering questions, but by preparing instructional handouts, subject guides to resources, bibliographies, and classroom instruction. Now, academic librarians have created excellent online guides to resources by incorporating their print subject guides and bibliographies of library resources onto their web sites. Several sites have taken advantage of the technology to include links online resources to their subject guides. Ken Middleton's guide, *Women's History: A Guide to MTSU Library and Internet Resources* is an example of a bibliography that includes both library resources and links to resources on the Internet. Another example that includes both library and Internet resources are the *Resource Guides by Subject* from the University of South Carolina. The *Women in Science and Technology* site combines library instruction, library resources, and Internet links to encourage and facilitate student research and learning. The Internet offers academic librarians a challenge and an opportunity to adapt this technology to the encouragement of reading for pleasure and knowledge, and to continue the tradition of the Readers' Advisor.

Web Site Examples
Book Browser

http://www.Polyweb.com/BookBrowser/index.html
Deaf in Literature from the Wallace Library, Rochester Institute of Technology
http://wally.rit.edu/pubs/guides/deafinlit.html
DeVry Dupage Library --lists new books added to the library collection
http://www.dpg.devry.edu/library/
Dollie's Corner from Northwestern University. A virtual leisure reading area. Recreational reading and Internet links. http://www.ghsl.nwu.edu/dollies_corner.html.
Good Reading from the Fairfax County Public Library
http://www.co.fairfax.va.us/library/reading/menu.htm
Good Books to Read from the Dayton and Montgomery County Public Library--lists of recommended titles in the usual and unusal categories--Books about food in fiction, and amnesia, etc, as well as the usual serial killers and vampires.
http://www.dayton.lib.oh.us/~ea_jan/goodreads.html
Good Reads from the Normal Public Library. Annotated lists of new fiction and non-fiction, movie tie-ins and cool magazines in the Normal Public Library.
If you Like....from a New Zealand Public Library.
http://www.ccc.govt.nz/Library/IYL/
If you like.... from the Allen County Public Library, Fort Wayne, Indiana.
http://www.acpl.lib.in.us/ACPL_Locations/Branches/shw_ifulike.html
Leisure Reading in Physics from the Wallace library
http://wally.rit.edu/pubs/guides/phybks.html
Literature and Languages: Selected Reading Lists from the Harold Washington Library Center. A wide variety of bibliographies and readings lists on various genres and topics.
http://cpl.lib.uic.edu/001hwlc/litlists/litlists.html.
Middle Tennesse State University Library lists new books, best sellers, readers' advisor, subject guides to resources and bibliographies.
http://www.mtsu.edu/~library
MIRAGe from the Mid-Illinois Readers' Advisory Group. Extensive lists, links, and bibliographies for the interested librarian and reader.
http://www.prairienet.org/mirage/homepage.html
MMC Newstand on the Web from Busse Center Library, Mount Mercy College.
http://www.mtmercy.edu/lib/newstand.htm
New Leisure reading at Russell Library from the Ina Dillard Russell library Georgia College State University. http://Peacock.GAC.PeachNet.EDU/~techserv/leisure.html.
NOBLE North Boston Library Exchange
http://www.noble.mass.edu/booklist.htm
NoveList from CARL Corporation. Home page for this electronic resource for Readers' Advisory.
http://222.carl.org/nlhome.html
Philosophy and Ethics: A Guide to Resources from Georgetown University, a library guide with selected resources.
http://gulib.lausun.georgetown.edu/dept/reference/philosophy/
Popular Books on Browsing from the University of South Carolina. A list of new books with links to plot summaries. http://www.sc.edu/library/catalog/browsing/poplar.html
http://www.sc.edu/library/catalog/browsing/brows.html (Browsing Home Page).
Readers Advisor for Information and Computer Science Heyward Ehrlich's book length essay and annotated bibliography on resources available on this subject.
http://newark.rutgers.edu/~ehrlich/clbook1.html
Reader's Advisory from MTSU University Library, a virtual reading room.
http://www.mtsu.edu/~vvesper/read.html
Reader's Advisory Services from the Los Angeles Public
Library. Mostly a listing of authors for different catagories of genre fiction.
http://www.colapublib.org/advisory/index.html
Reader's Advisory-Fiction the Web Station of the Flint Public Library in Michigan.
The purpose here is to suggest Internet resources which will allow staff and patrons the opportunity to make informed choices in the areas of book selection and reading material in the five genre sections that the library's collection is divided: General Fiction, Mysteries; Romance; Science Fiction; Westerns and Short Stories.

http://www.flint.lib.mi.us/fpl/resources/FPL_Readers_HomePage.html
Reader's Robot from Kevin Kierans, Manager of Library and Support Services at Thompson Nicola Regional District Library System, Kamloops, B.C.
http://www.tnrdlib.bc.ca/rr.html
Readers' Services Page from the Rochester Hills Public Library includes Sites for Book Lovers with links to book reviews, author interviews, awards, genre fiction, lists of books, ideas for reading groups.
http://metronet.lib.mi.us/ROCH/readadv.html
Resource Guides by Subject from the University of South Carolina, Thomas Cooper Library. Includes library resources as well as Internet resources. http://www.sc.edu/library/tcl.html#bibs
http://www.sc.edu/library/bibs/womsci.html
Romance Novel Database from Christiana Powell at the University of Michigan. Many annotations and reviews as well as links to resources in the genre.
http://www.sils.umich.edu:80/~sooty/romance/
University of Missouri-St. Louis includes in their virtual library a small section for leisure reading.
http://jinx.umsl.edu/services/library/virtual/
Virtual Reader's Service Desk from the Morton Grove Public Library. Many services for readers, including bibliographies, coming bestsellers, annotated list of selected new books, links to other book related sites.
http://www.nslsilus.org/mgkhome/mgpl/rsdesk.html

Works Cited

Blackwood, Charlene and others. "Pleasure Reading by College Students: Fact or Fiction?" paper presented at the Mid-South Educational Research Association (Lexington, KY, November 13-15 1991), ED 344191.

Bloom, Alan. *Closing of the American Mind.* New York: Simon and Schuster, 1987.

Drury, Francis K.W. *Book Selection.* Chicago: ALA, 1930.

Farber, Evan Ira. "Turning Students into Readers: Librarians and Teachers Cooperating," paper presented at the Annual Meeting of the International Reading Association (33rd, Toronto, Canada, May 1-6, 1988), ED 302807.

Harrington, Mildred P. "Free" Reading and the College Undergraduate." *The Library Journal.* 60. (1935): 947-952.

Johnson, Roberta S. " Lost and Found in Cyberspace: Reader's Advisory on the Internet". Program presented for the Library Administrator's Conference of Northern Illinois, September 27, 1996. URL: http://www.nslsilus.org/mgkkhome/mgpl/ranet.html.

Lyle, Guy R. *The Administration of the College Library.* New York: H.W. Wilson Company, 1949.

Marks, Susan. "Browsing Rooms Redivivus," *American Libraries* 7. (1976): 94-95.

Randall, William M. and Goodrich, Francis L.D. *Principles of College Library Administration.* Chicago: ALA, 1936.

Regents of The University of Michigan. "Residence Hall Libraries at the University of Michigan." URL: http://www.rhl.housing.umich.edu/rhl.html, c1995.

Shelton, Regina. "The Lure of the Browsing Room." *Library Journal* 107 (1982): 410-413.

Smith, Duncan. *Readers' Advisory Renaissance.* From "Readers' Advisory Goes Electronic program at the National Public Library Association meeting in Portland, Oregon. URL: http://www.carl.org/nl/pla.html, (no date).

Zauha, Janelle. "Recreational Reading in Academic Browsing Rooms: Resources for Readers' Advisory." *Collection Building* 12 . 3-4 (1993): 57-62.

Zill, Nicholas and Marianne Winglee. *Who Reads Literature?* Washington D.C.: Seven Locks Press, 1990.

[TOP]

Teaching Precalculus with Scientific WorkPlace 2.5

Vlajko L. Kocic

- Abstract
- Introduction
- Scientific Workplace as a Teaching Tool
- Course Materials
- Set of Classroom Notes (Handouts) for Students
- Set of Classroom Notes and Slides for Instructors
- Assessment and Performance on Exams
- Further Development
- Bibliography

Abstract

Starting with the Fall 1996 semester, at Xavier University of Louisiana, Scientific WorkPlace 2.5 has been used in a classroom as an ``intelligent electronic chalckboard,'' as a tool for the preparation of lectures and other course materials, and in implementation of on-line lectures and tutorials available to students. The main goals were to increase the active participation of students in the classroom, their early exposition to modern technology, and creation of an environment for the effective implementation of other teaching techniques. In order to assess the effectiveness of the use of this technology in the course, the content of the course has been the same as in other sections of Precalculus and students took the same exams.

Introduction

At Xavier University of Louisiana, Precalculus is one of the largest courses offered by the Mathematics Department. Between eight and eleven sections are offered each semester and one in the summer. This is a coordinated course, where all sections are required to cover the same material, students take common tests and final exam, and the grading policy is uniform for all sections. The textbook with mainly ``traditional'' approach has been used .

Starting with the Fall 1996 semester, in one section of Precalculus, the software Scientific WorkPlace 2.5 has been used for the development of various course materials, implementation of on-line lectures and tutorials, and in the classroom as a teaching tool. Classes were held in an electronic classroom equipped with PC computer with Windows, projection system and camera.

The main goals in this project were to increase the active participation of students in the classroom, their early exposition to the modern technology, to emphasize the multiple approaches (numerical, graphical, and symbolic) when introducing a concept, and the creation of an environment for the effective implementation of teaching techniques like active learning, cooperative learning, and other.

In order to assess the effectiveness of the use of this technology in the course, the content of the course has been the same as in other sections of Precalculus and students took same exams.

Scientific WorkPlace as a Teaching Tool

The main reasons why Scientific WorkPlace has been selected are the following:

- The Windows implementations of TeX and LaTeX (today widely accepted as a standard in mathematical typesetting) are supplied in Scientific WorkPlace. Course materials prepared in this way have professional quality.
- Available hypertext links in on-line documents (tutorial) provide the student with easy access to the related topics.
- The computational component of Scientific WorkPlace uses Maple V\, Release 3, engine with standard libraries with the interface which provides easy, direct access to the mathematics needed, without requiring the user to familiarize with the syntax of Maple V.
- In a classroom, Scientific WorkPlace 2.5 could used as an ``intelligent electronic chalkboard.'' Instead of writing on the chalkboard, the instructor types the text and mathematics, which are projected to the screen. When solving problems, the full capacity of Maple V computer algebra system allows you to emphasize the multiple approaches in teaching and learning: numerical, graphical, and symbolic.
- Complete records of material covered during the class period (concepts introduced, examples solved, answers to questions, etc.) can be saved for later analysis and improvement and printed for the students who need to make-up work.

Course Materials

The following course materials have been developed and classroom tested:

Tutorial ``Precalculus: Multimedia Lectures on Selected Topics''

The tutorial has been developed using Scientific WorkPlace 2.5. Each lecture includes a brief summary of the theory, completely solved examples, followed by the set of exercises. Many problems are designed to be solved by using the Maple component of Scientific WorkPlace 2.5. A tutorial has been installed on the computers in the Mathematics Tutoring Lab and is available to the students there. The following topics have been covered:

- Basic techniques for graphing functions
- Quadratic functions
- Factorization and graphing of polynomial functions
- Graphing of rational functions
- Graphing exponential and logarithmic functions
- Graphing trigonometric functions
- Conic sections
- Review - contains some basic definitions and related results
- Hints - contains some hints how to use symbolic algebra capabilities of Scientific WorkPlace 2.5

Set of classroom notes (handouts) for students

A complete set of skeleton handouts has been developed for students. Each handout contains a brief summary of theory, followed by examples and problems to be solved in the class. In general, each handout contains the material which can be covered during the class period and typically it is between two and six pages long. Examples and problems are not solved but only formulated with the space left for students to write the solution by themselves or to copy it from the projection screen. Examples are selected in such a way as to illustrate concepts by emphasizing the multiple approaches in problem solving (numerical, graphical, and symbolic), to stimulate critical thinking, and to connect the presented material with real-life applications.

Set of classroom notes and slides for instructors

A complete set of ``slides'' for instructor to be used in the electronic classroom has also been developed. ``Slides'' do not follow the traditional format (bullet list containing important facts illustrated with pictures, completely solved examples, etc.), but rather create the environment in which students together with instructor explore the newly introduced concepts. ``Slides'' are adjusted to fit capabilities of

Scientific WorkPlace. They contain more information than handouts. Also, as in the handouts, most of the problems are only stated problems without solution. In the traditional lecture format class, when solving a problem in a classroom, the instructor may type the complete solution, explaining each step in the process, by using Scientific WorkPlace as an ``electronic chalkboard". On the other hand, when the emphases is on active learning and when students solve the problems in groups or individually, it enables the instructor to present only the final answer and let students check their work.

Assessment and Performance on Exams

During the Fall semester students had five one-hour tests, quizzes and homework assignments. Students in this section took the \textsl{same one-hour tests and final exam at the same time } as students in other sections of Precalculus. The final grade\textsl{\ has been calculated in the same way} as in other sections of Precalculus.

Overall students' performance on exams was excellent (30\% of students received grade A, 40\% grade B, 27\% grade C, and 3\% grade F). It is important to mention that in this class none of the students dropped the course. All students who were registered at the beginning of the semester took the final exam. There are many other factors that may influence such a good performance of students and in this moment those results need to be accepted only conditionally. For example, traditionally the performance of Precalculus students in Fall semester is much better than in Spring. This needs to be examined in the longer period of time before the final conclusion is made.

At the end of semester two surveys were conducted and students evaluation. The first survey is the Electronic Classroom Evaluation. Students rated from 1 (strongly disagree) to 5\ (strongly agree) various aspect of the effectiveness of the use of electronic classroom in this course. Students prefer electronic-classroom format to the standard chalkboard format and this format enhanced their understanding of course content. Students found that slides were very easy to read (4.23). Also, the camera projection system was very effective teaching tool (4.04), in contrast to the whiteboard (3.0). Students found that the electronic classroom provides the same opportunities for class discussions as the traditional format (4.04), and they will recommend to their fellow students to take this course using electronic classroom format (4.08). They disagree that the electronic classroom format provides fewer opportunities for student-teacher interaction (2.46) and for student participation (2.23). Many comments like ``Easy to read. Some teachers handwriting is bad", ``You can see what teacher is writing while he is writing", ``The screen is always visible opposed to the chalkboard; you never miss any steps or notes", clearly indicate the effectiveness of use of Scientific WorkPlace as ``electronic chalkboard" in the classroom.

The second survey targeted the use of handouts and active learning approach in the classroom. Students found that handouts were very useful (90\%) and that the price they paid was worth (92 \%). The ``skeleton" handouts help them to follow more closely than usually the material covered in class (92\%) and the course was more enjoyable than other mathematics courses they have taken (88\%). They definitely prefer the ``active learning" method than the conventional ``lecture" format (95.8\%). It is interesting to note that for most students (90\%), handouts were the main source of information in this course and the substitute for the book. Also, they shared handouts with students in other sections of Precalculus taught in the traditional way.

Further Development

On the regular basis, the developed course materials will be reviewed and revised accordingly. Currently, there is an on-going project regarding the development of the techniques for assessment of the effectiveness of the use of various teaching techniques and the technology in Precalculus. As a part of on-going research, in one section of Precalculus only handouts have been used, while teaching has been in the ``traditional chalkboard" classroom. One of the outcomes of such a project will be comparison between the use of technology and traditional methods while using the same ``active learning" approach.

Bibliography

D. W. Hardy and C. L. Walker, Mathematics with Scientific WorkPlace, TCI Software Research, Las Cruces, NM and Brooks/Cole Pub. Co., Pacific Grove, CA, 1995

R. Hunter and S. Bagby, Creating Documents with Scientific WorkPlace and Scientific Word, TCI Software Research, Las Cruces, NM and Brooks/Cole Pub. Co., Pacific Grove, CA, 1995

V. L. Kocic, MATH 1030 Precalculus, Multimedia Lectures on Selected Topics, Xavier University of Louisiana, New Orleans, LA, 1996

R. E. Larson and R. P. Hostetler, Precalculus, 3rd rd., D. C. Heath and Co., Lexington, MA, 1993

J. Thornhill, Scientific WorkPlace for Windows, p305-311.

[TOP]

The Electronic Term Paper in the French Literature Class

Susan Spillman

- Introduction
- Description of the Project
- Observations
- Conclusion

Introduction

The traditional term paper has long been assigned by instructors in upper-level literature classes in order to promote guided research by students, who as a result of carrying out their studies read and analyze much more material than it is possible to cover during class hours. Through assigning a long project, the instructor demands a depth of mastery which is rarely possible in the limited time available for class.

The incorporation of multimedia technology into the teaching of literature has great implications for the study of literature and the other disciplines of the humanities. Because such technology can give access to more extensive and varied sources in a shorter period of research, students can gain far more knowledge of the historical and cultural significance of literary works in the time traditionally allotted for teaching survey courses. At the same time, multimedia resources facilitate delivery of more information without increasing faculty size. Rather than fostering the traditional separation of disciplines, multimedia courseware provides for integration of art, architecture, music, history, and literature. Because cultural monuments and documents are presented together, students learn how each discipline informs the others and how the social milieu that gave rise to literary works also produced other arts that reflected or contradicted the mores of the era. As the advantages of educational technology become more readily available to teachers of literature, presentation slides and interactive software for classroom and individual student use make possible a more integrated study. The instructor can now take into consideration the multimedia resources which are available to students, and can reshape the traditional term paper into a multimedia project enhanced with sound, images, and varying presentations of text without sacrificing depth or rigor in research.

Description of the Project

Xavier University of Louisiana has committed both faculty development resources and technical support to the integration of instructional technology into classes in all departments. In keeping with the mandate to increase the use of the computer in humanities classes, the author began the preparation of instructional materials for both elementary language and upper-level literature classes. After having written a long HyperCard tutorial on the Chanson de Roland for student use in the French medieval literature survey class, the author decided to investigate whether or not such a program designed for individual work outside of class could also be useful in a direct classroom presentation. When the students were assigned to read sections of the Roland in modern French verse, they were directed to the computer laboratory adjacent to the Department of Languages, where the program was installed on enough machines to serve the needs of all six students in the class. The class met in the laboratory once per week during the time that the Roland was being studied, and the instructor showed part of the stack and directed discussion of the passages already studied. In addition, the students were required to go to the laboratory and work individually. At the end of the semester, the class members were asked to write short evaluations of the course, including comments upon the electronic presentation. All agreed that they preferred the multimedia program to the traditional textbook. Their reactions were indicative of

how beneficial such technology can be if properly applied to literary study; scanned photographs made it possible for students who had never seen Romanesque architecture, or even heard of it, to observe the style and gain awareness of basic design techniques. Since Gregorian chants were used to highlight the passages documenting the beginning of the battle (Te Deum laudamus), the death of Olivier (Requiem aeternam), and the suffering and death of Roland with the subsequent passing of his soul to paradise (Libera me and In Paradisum), students whose previous experiences with plainsong were gained in listening to the rock group Enigma heard the music in association with events which would have occasioned its use. Buttons directing students to the chant texts in Latin and French and explanations of the liturgical year and the basic types and roles of chant enabled users to learn about early religious music without needing to perform extensive musicological research. Although Xavier University of Louisiana is a Catholic university, only one of the six students in the class had ever heard a Gregorian chant, and that was in a music appreciation class. As the possibility of enhancing the study of literature with the addition of information concerning the other arts and the history of the period became apparent, and as the economy of time made possible by using instructional technology became evident, the author began to seek more ways to incorporate multimedia into her literature classes. She was especially concerned with requiring students to develop their own projects, incorporating available technological resources in addition to traditional research.

In order to facilitate the transition between instructor-developed software and student projects, the author used a departmental course, Special Topics in French, to direct four students in selected research and multimedia techniques. One member of the class, Ms. April Gilbert, chose for her subject Une si longue lettre by Mariama Bâ, one of the first African women to gain prominence as an author. In assembling her project, Ms. Gilbert used pictures captured from the Internet, an interview with Prof. Amadou Koné divided into video clips, and music to complete the presentation of her research. Her work was divided into three sections: (a.) biographical information concerning Mme. Bâ followed by a survey of critical study concerning Une si longue lettre ; (b.) the interview with Prof. Koné, divided into a series of alternating slides with question texts and voice-over audio, each followed by a video clip in which the scholar gave his response to the question; and (c.) her own analysis of Mme. Bâ's work and her significance as a voice for African women in the 1970's.

Ms. Gilbert acquired basic knowledge of PowerPoint, used Disc-to-Disk 1.5 for audio capture, and developed a series of interview questions as the basis for her video section. She used several search engines for her Internet research, including Lycos, Yahoo, and the Web Crawler in order to locate resources concerning Senegal as well as critical information concerning Mme. Bâ. By including Internet sites in her study, she was able to enhance her written work with photographs, maps, and other graphics captured directly from the electronic resources.

The other three students collaborated with the instructor in the development of a project on the troubadours and trouvères , presented at the Thirtieth Annual Western Michigan Medieval Congress at Kalamazoo, Michigan in May, 1996. In this project, the instructor developed and assembled the architecture of the stack, and the students bore the responsibility of research, writing, and editing of the text which was incorporated in scrolling fields on the cards. Since the work was interactive, the group utilized HyperCard 2.2 as the basic program and worked primarily with HyperGasp 2.3 for the addition of scanned images, music, and color. Music captured with Disc-to-Disk 1.5 completed the project.

Students were permitted to do a part of their work on the instructor's office computer, a Macintosh Performa 6115CD. Ms. Gilbert obtained most of her visuals from the Internet, with some scanning assistance from the instructor. The visuals for the troubadour project were scanned in the faculty workroom; because there was no scanner available for student use at the time, the instructor made a considerable commitment of time for scanning the images selected by the class members.

Observations

The author kept a record of her observations concerning the works in progress throughout the semester in order to document not only the changes in procedures which became necessary as the students worked, but also the advantages and limitations of the electronic term paper itself. The increased demands for commitment of the instructor's time became evident during the first week as students who

had no formal training in art history, architecture, or music began to request assistance with assembling the bibliography and discography. This highlighted a fundamental weakness encountered by teachers of literature throughout the country; students who write term papers often underestimate the time and thoroughness necessary to prepare sufficient documentation before beginning to write. Producing multimedia work incorporating visual and audio documentation without sacrificing any of the historical and critical reading required demands a much greater commitment of time in both preparation and production. Since access to equipment was limited during the beginning of the semester, a problem alleviated by the opening of the multimedia student computer laboratory adjacent to the Department of Languages, the class members often resorted to working on the computer in the instructor's office.

The instructor's observations and experience verified that students who are motivated and capable of writing good traditional term papers will do excellent work in multimedia projects. Ms. Gilbert worked independently except for some initial training in PowerPoint and produced an excellent electronic term paper. The troubadour project demonstrated that students who are weak in research skills or lacking in motivation will do no better work in multimedia than they would have done in traditional formats. At the end of the semester, only one of the three received a satisfactory grade. She developed some competencies in HyperCard, and her basic research was excellent. The other two students wrote poorly, showed no interest in learning even minimal multimedia techniques, and resisted the instructor's attempts to motivate them.

The electronic term paper requires a considerable time commitment from the instructor, who must conduct individual meetings with students in order to teach them the technology, work sessions for assembling the project, and direction in research. Electronic resources must be available to students, as is the case in large universities where students are accustomed to using multimedia facilities and resources. In small colleges where students do not own large computers with sufficient memory to do work incorporating audio and video clips, or who may have little or no access to electronic work rooms and technical assistance, multimedia projects may be limited to simple PowerPoint or HyperCard embellished with ClipArt or simple scanned images which do not require large amounts of memory. Because of time demands placed upon the instructor, the electronic term paper would not be practical in large classes unless students have a laboratory assistant who is willing to help them with the technology.

Students must submit their research ideas very early in the semester, and the instructor must be sure students have a clarity of vision as to what can be done. In addition to the time needed to carry out adequate research for development of the content, the audio and the graphics must be assembled. If interviews or other videos are to be included, the scripts must be prepared and sufficient time allotted for the filming and digitizing. Both students and instructor need to understand what the purpose of the project is; a literature class is not a studio art class. Students' abilities may be limited, some may be technophobic, and access to scanners and other equipment minimal. The instructor must be willing to do the scanning herself if students are not allowed in the workroom; some techniques, such as grabbing images from the Internet, are not difficult but help must be available unless the student already knows how it is done. In electronic term papers, substance and appearance are closely interwoven; all students do not have the same aesthetic perceptions or artistic abilities. If instructor is not very clear about expectations, grades can become debatable. One student who received an F in for her non-participation in the troubadour project thought that it was "not fair", since she did not have any coursework in computer science. It must be stated that she found most requirements "not fair" during her tenure at the university.

Multimedia projects are expensive. Either the students or the instructor must purchase the audio CD's, and technical assistance is necessary if videos are to be made or digitized. The Department of Mass Communications furnished some technical assistance; however, because of the heavy demand for equipment use in their facilities, we were not able to rely upon student assistance in order to produce the videos. Ms. Gilbert was able to request funding from the department only because of a commitment by Xavier University of Louisiana to the incorporation of multimedia in all classes. She was able to draw upon the resources of Tulane University in order to interview Professor Amadou Koné; in areas where there are no research universities close by, students will have to travel long distances in order to carry out interviews with scholars in their fields of interest.

In addition to the above considerations, instructors who decide to require electronic term papers will encounter some resistance from colleagues whose teaching styles are more traditional. The most common criticism of the African and medieval literature projects carried out at Xavier was that they were mere substitutions of "bells and whistles" for substantive research. Instructors who dismiss as frivolous the understanding of the cultural role of Gregorian chant in medieval society or the expressive value of modern African music as a conveyer of both individual and communal concerns will not recognize the value of including audio in research projects. However, no students ever voiced such objections. Although at the beginning they resisted the increased time commitment necessary for the preparation of their projects, after becoming involved in the work, the motivated students found the experience to be more satisfactory than the preparation of a traditional term paper.

Both instructor and students must be familiar with the copyright laws governing classroom copying. These are summarized in the "Agreement on Guidelines for Classroom Copying In Not-For-Profit Educational Institutions With Respect To Books and Periodicals" (Questions and Answers on Copyright for the Campus Community, The National Association of College Stores, Inc. and the Association of American Publishers. Oberlin, Ohio, 1989. Appendix A, pp. 16-17):

MULTIPLE COPIES FOR CLASSROOM USE:

Multiple copies (not to exceed in any event more than one copy per pupil in a course) may be made by or for the teacher giving the course for classroom use or discussion, provided that:

A. The copying meets the tests of brevity and spontaneity as defined below; and,

B. Meets the cumulative effect test as defined below; and,

C. Each copy includes a notice of copyright.

DEFINITIONS:

Brevity:

i. Poetry: (a) A complete poem if less than 250 words and if printed on not more than two pages or (b) from a longer poem, an excerpt of not more than 250 words.

ii. Prose: (a) Either a complete article, story or essay of less than 2,500 words, or (b) and excerpt from any prose work of not more than 1,000 words or 10% of the work, whichever is less, but in any event a minimum of 500 words.

iii. Illustration: One chart, graph, diagram, drawing, cartoon or picture per book or per periodical issue.

Spontaneity:

i. The copying is at the instance and inspiration of the individual teacher; and

ii. The inspiration and decision to use the work and the moment of its use for maximum teaching effectiveness are so close in time that it would be unreasonable to expect a timely reply to a request for permission.

Cumulative Effect:

I. The copying of the material is for only one course in the school in which copies are made.

ii. Not more than one short poem, article, story, essay or two excerpts may be copied from the same author, nor more than three from the same collective work or periodical volume during one class term.

iii. There shall not be more than nine instances of such multiple copying for one course during one class

term.

Because the author purchased audio CD's and books containing all the material ted for the projects under discussion, she assumed that she would be protected by the fair use doctrine. It was only after she was denied permission to put the Roland and troubadour projects on the file server that she reviewed the guidelines and realized that there were some violations regarding visuals and length of quoted materials. Should such violations occur when a project is prepared, both instructor and students must be scrupulous in refusing to make copies or to place the programs on a server in order to make sure that no possibility of multiple duplications can be implied.

Conclusion

Maing a significant transition from one pedagogical approach to another is usually difficult and demanding of more time and effort than initially anticipated. Departures from ordinary course requirements imposed upon class members cause some resistance from motivated students and often result in a refusal to make more than the usual effort from others. Instructors find that even with careful planning the work load is significantly increased and the benefits derived from such an increase are not readily apparent.

In spite of the difficulties encountered in its implementation, the electronic term paper has considerable merit. Whether done as an individual project or as the result of a team effort, the multimedia project gives both students and instructor the opportunity to develop a breadth of information which is not possible when research is limited to the printed word. Students who do such work gain experience in courseware development which can be used in their classrooms when they enter the teaching profession. Because of present demands for increasing expertise in computer applications, those who learn how to prepare a basic PowerPoint or HyperCard presentation will be capable of developing such projects in whatever career fields they select.

The acquisition of basic knowledge in art, music, and social history which results from the preparation of an electronic term paper helps students to form a more comprehensive awareness of the period under study. As more and more universities make the transition from a focus upon teaching to an emphasis upon learning, and the instructor becomes more and more a facilitator of student learning, the development of student-constructed multimedia projects under the guidance of the faculty member helps to shift the instructional paradigm and reconstruct the traditional classroom relationship to require more proactive learning.

[TOP]

Using Web Pages as Supplementary Class Materials

David Starrett

Abstract

Web pages developed as supplementary materials for biology classes at Southeast Missouri State University will be displayed. These pages contain syllabi, instructor office hours, study guides, and links to related sites, as well as bulletin boards, interactive quizzes and interactive copies of old exams. Conferees will be encouraged to participate in interactive demonstrations of class bulletin boards and on-line quizzes and exams. Additionally, web pages used as advising tools within the major and web pages designed to provide information on laboratory research at Southeast Missouri State University will be displayed.

Paper

Within just the last few years the accessibility and capabilities of the Internet, and the Web in particular, have exhibited extraordinary growth. The potential for taking advantage of this resource in the teaching environment is also expanding rapidly. One year ago, our department dedicated a 386 computer as a web server, which has since been replaced with a Pentium-based machine. The server runs under the Linux operating system, and is maintained by a faculty member in the department with assistance from members of the Computer Services staff. Over the past year, we have thus begun to include the Web as a supplementary resource for classes in our department.

All majors within the Biology Department at Southeast Missouri State University are required to take a certain set of core courses, followed by selected upper division classes based upon their area of interest within the Biology Department. A few of the faculty in the Department have developed web pages for most of the classes in the core curriculum and some of the upper division courses. All of the core course homepages include general syllabi, with most also providing a detailed syllabus containing the class calendar, instructor office hours and contacts, and course policies for the current semester. All of the pages also contain links to relevant sites on the web. Such sites include course pages for similar classes at other institutions, pages for related programs, pages with related themes or subjects, and library and database access. The web pages associated with upper division classes are similar to the core course pages.

Some of the pages contain interactive features as well. Bulletin boards are used for a number of courses. These boards are used by students to post questions, comments, or suggestions regarding the course and related subjects. Additionally, some of the pages have quizzes and old exams which are also interactive. All of these interactive features run as CGI scripts, calling programs written in PERL by one of the department's faculty members.

The course page for our introductory majors biology class (B1 120) contains a general outline of the course syllabus as well as the specific daily calendar for the current semester and the office hours, phone number, etc. of the instructors. Though this information is duplicated on the handouts given to the students on the first day of class, the information is always present on the web page and is therefore constantly available to students. The course utilizes a 1 16 page study guide written specifically for the course. This study guide is also reproduced on the course page. The study guide is written in daily theme-oriented units and is presented on the web as a set of linked pages broken up into these specific elements. The web version of the guide contains relevant links to the particular subject areas referred to in these various units.

The pages for this course also contain links to other related sites on the web, including many that relate to theme of the course, which is using biological information to test hypotheses about evolution. This allows the student to visit other pages containing information about the subject, including pages dealing with evolution versus "scientific" creationism, pages dealing with the scientific process, and pages containing basic information such as phylogenetic trees, etc. The web provides a breadth of information sources and an ease of access that would be difficult in an alternative medium.

One of the most important uses of the web in this course is the class bulletin board. Students are encouraged to post messages to the board and can include questions, comments, opinions, or other statements relating to the class. We have found that students are more secure in asking questions on the board than in the classroom. Even though the students include their names in the posting, it is apparent that many students feel less intimidated posting to the board than in face-to-face class discussion. Questions are brought up which don't arise in the classroom environment, or which would not be voiced by the more timid students. The class theme contains controversial material in relation to the evolution versus creationism debate. Students often have strong opinions on the subject, but are afraid to bring them up the classroom for fear of being ostracized by fellow students or the instructor. The bulletin board allows these opinions to be expressed. Typically this leads to a series of related comments by other students. In essence, then, a dialogue which is not as likely to occur in the classroom occurs on the bulletin board. Though this can open the student up to brasher criticism than in the classroom, our experience has been that the exchange of ideas and opinions is normally civilized and leads to a quality "virtual" discussion.

The bulletin board dialogue also allows the instructor to gauge the students' understanding of and competency with the subject material. Again, the security of the web allows for comments less likely to occur in the classroom. This increases the ability of the instructor to gain insight into the thinking of the students. The bulletin boards accept HTML tags, which means that postings can include web page characteristics so that it is possible to post a message containing a link to a relevant site or a graphic useful in explaining or answering a question. Though relatively few students know enough HTML to use this feature, the instructors are able to respond to questions by posting links to relevant pages. The bulletin boards are also used by the instructors as another medium to post announcements and exam results. Finally, students are encouraged to become comfortable using the bulletin board in this class as similar boards are used in other courses in the core sequence as well as in some of the upper division courses.

Principles of Heredity (Bl 140) is a course in the core curriculum taken by most majors in their second semester. The home page for this course, along with those of other genetics-related courses in the department, is accessible from a Genetics page. In Bl 140, the bulletin board has been more directly content-driven than in Bl 120. Students post questions on the board about the material covered in class, or about related topics, and most commonly the instructor responds. In some cases, the instructor will e-mail a question outside his area of expertise to another faculty member in the department, inviting a response. A recent modification to this program allows the instructor to use a web-based form to respond to individual posts on the board, contributing to the question-answer style of the board in this course. The instructor is compiling a frequently asked questions (FAQ) file from student questions on the board, to be added to the course page in future semesters. The bulletin board helps the instructor to identify students' problems in understanding the course material, to respond in a way that is accessible to all the students, and to keep an automatic record of these exchanges for future use.

One faculty member in the department teaches an interdisciplinary course, Ul 415 Science and Religion, which makes extensive use of a class bulletin board. In this case, the students, who are mostly seniors in the honors program, use the board to continue class discussions outside the walls of the classroom. As noted before, some students who are quite reticent in person are more comfortable expressing their ideas on the web. It is also apparent that students vary greatly in their preferred times of day for thinking about the course and related issues. The bulletin board is a means of synchronizing the communication of students who have wildly divergent schedules. One student may post a comment at 1 AM, drawing a response from another student at 8 AM; these two might never encounter each other outside of class in any other way. The instructor also uses this board to provide current links; while many resources relevant to the class are available on the home page, the board was the easiest way to give students a link

to an article on the Web about the recent experiments in cloning sheep, for instance.

Old exams are sometimes kept on file for various classes and made available to students. In the core botany course, old exams are placed on the course pages. These exams include all the original questions. The exams are designed to be interactive and contain buttons which allow students to call up the answers. Students can thus read a question, answer the question for themselves, and then view the instructor's answer. An interactive quiz is included on the genetics page, although this resource has not been used formally in the class yet.

In addition to specific course pages, pages have been set up which detail the course requirements for the specific areas of interest within the Department. These pages allow students to determine the specific classes required for each particular area and even which semesters or years those classes are offered. For example, students in the core botany class can look up the advising page for the botany major. These students can then determine what would be required for specialization within that area of interest. If a student is interested in botany, this may allow him or her to consider how to arrange a schedule to fit that area of interest. Some of the area of interest pages have links to course pages for the classes required and recommended for the major or specific area of interest. Students can thus explore the specific areas of interest within the major on their own and follow links to many of the required courses to determine the course layout and content. This can allow a student to make educated decisions regarding areas of study within the biology major through the Web. In the relatively short time that these pages have been running, some students have already used them for the intended purpose and responded with positive comments about their use.

Students are encouraged to seek out research projects with faculty members in the Department, often with faculty involved in research in the student's specific area of interest. We have designed homepages for some of the research laboratories in the Department. These pages contain information about current and past research projects. References to publications by the faculty or students are also listed. Most have links to outside pages relevant to the research project, including other laboratory pages, suppliers, jobs, industry, etc. Prospective students, students in particular classes, or students taking a class with a particular professor can investigate relevant research projects within the Department. This may aid students in deciding what laboratories to seek projects in, or may even expose students to projects, encouraging them to seek out research opportunities with particular faculty members.

The experience of the past year indicates to us that there are some applications in which the Web is very useful as an outside resource for classes. It is necessary in most cases to provide the students with some impetus to begin using web sites, such as an assignment or some homework points for posting on a bulletin board. Some students arrive at the institution with no prior computer experience, and need special assistance to become comfortable with the web. The interactive nature of the web bulletin boards, the constant availability of information over the web, the ease with which connections can be made to outside resources, and the ability to rapidly update information to follow a changing field, are all advantages of the web over other ways of communicating with students. While this technology in no way supplants traditional forms of communication, it provides an added dimension that enriches a number of our classes and programs.

[TOP]

Utilization of High Definition Audio to Create CD-ROM-Based Multimedia for Ear Training and Microphone Technique

Doug Mitchell

- Introduction
- Specialized CD-ROM and the Music and Professional Audio Target Market
- Attempts to Utilize Audio in Multimedia
- Low Bit Rate Audio
- Problems in Aural Multimedia Utilization
- File Formats
- Format Conversion
- Software Incompatability
- Hardware Problems
- Audio in Multimedia -- an Example
- Test Parameters
- Recording Procedure
- Test File Formats
- Listening Test
- The No-Compromise Approach
- Conclusion
- References

Introduction

This paper serves as an introduction to the use of audio and various audio file formats for use in integrated multimedia productions. It will also detail the process of putting together a multimedia CD-ROM designed to examine microphone techniques. The goal of the multimedia audio producer is to utilize a variety of techniques for recording and formatting audio while preserving the highest possible quality for playback in the various multimedia formats. In many cases, this goal is compromised by the conflicting demands of data preservation, available data real estate and conventional data throughput on eventual end-user platforms

The field of multimedia production and deployment on CD-ROM continues to change rapidly with advances in technology - both for authoring as well as deployment. The techniques, formats and considerations illustrated in this paper, then, should be considered as a static mile marker on the winding highway of technological progress in electronic multimedia.

Specialized CD-ROM and the Music and Professional Audio Target Market

Many CD-ROM titles available today target interests in music. Microsoft has produced a popular title on musical instruments. Todd Rundgren, David Bowie, The Rolling Stones, The Cranberries, Sarah McGlaughlin, Peter Gabriel, The Beastie Boys, and the Residents have all produced popular music CD-ROM titles or Enhanced CD+ titles. CD+ is a hybrid, mixed-mode CD with the first track representing data (sometimes indicated as track one and certainly to be avoided for playback over loudspeakers), and the balance of tracks (2 through 99) represented as Red Book digital audio. Other approaches to the use of Enhanced CDs include the use of a "zero" track integrated with index and

pre-gap area where data can be stored (this type of disc has been referred to a CD-ROM-ready and is proposed for inclusion in the Blue Book standard) and a "Multisession" approach where Red Book audio is stored in session one on the disc and data is stored as session two. Specialized software drivers are required by many CD-ROM players to recognize the second session on the disc. [1], [2] The Todd Rundgren, Peter Gabriel, and David Bowie CD titles feature various levels of interaction with the user. Classical music is well represented with CD-ROM titles available on Beethoven, Brahams, Stravinsky, Mozart and a host of others which feature not only the music, but information on the scores, reviews by musicologists, period art, and so forth. The Voyager company has released a CD-ROM version of "A Hard Day's Night" with the complete film displayed in QuickTime movie format with the script, photos, and a running dialogue with the director, Richard Lester. The list of available titles in this genre grows daily.

More recently, some multimedia producers have begun to tackle various aspects of professional audio. A good example of this type of target market approach is the "Allen Sides Microphone Cabinet" produced by Light Rail Communications for Cardinal Business Media, publishers of Mix Magazine. [3] This title utilizes a mixed-mode method of CD-ROM authoring which allows the user to access the audio for various microphone examples displayed via Red Book audio tracks. This title has proven to be an excellent supplemental tool for teaching classes in recording technology.

Light Rail Communications also produces a quarterly CD-ROM professional audio magazine called "Control". [4] This CD-ROM, like the Allen Sides' title, is also produced as a mixed-mode title. It contains both data and Red Book audio in its articles on various products and people in the recording industry. This has also proved to be a wonderful teaching aid.

Most recording studios utilize at least one computing platform. CD-ROM and other multimedia titles are also proving to be good for use as professional audio equipment sales tools and for use as on-line instruction manuals, calibration tools, reference recordings and so forth.

Attempts to Utilize Audio in Multimedia

Since the term multimedia has been utilized in the computer world it has always included sound as one of the principle media involved. The Apple Macintosh computer unveiled in January, 1984 included sound capabilities. However, until the AV Macintosh line was introduced in 1993, the Macintosh sound recording and playback capability was limited to 8-bit sampling. The Multimedia Personal Computer standard (MPC) implemented in 1991 also included sound. [5] The current MPC level 2 which included a 16-bit audio standard was formalized in 1993. [6], [7] Most sound recording and playback hardware available today for either the Macintosh or the PC platform now support compact disc-quality audio capabilities with 44.1 kHz sampling and 16-bit sample depth. However, processing full bandwidth audio in stereo requires a system throughput of 176.4 kilobits per second. This data rate is feasible, but can cause conflicts with other data attempting to stream off a hard drive or a CD-ROM simultaneously.

Most of us are familiar with the early uses of audio in computer systems. On PCs, the internal speaker can be caused to make sounds when programming a single bit controlling the rate of a dc voltage. This produces the familiar system beeps. Some developers began to utilize this programmability to produce simple sounds for games or other applications. However, once the sound card was available for the PC, numerous other applications for sound on the computer began to appear.

Low Bit Rate Audio

Perhaps the most severe compromise in working with multimedia audio is the need to utilize low definition audio characterized by low sample rate and truncated bit depth. Although it is possible to produce audio files which exhibit some degree of fidelity at bit depths of 8 bit and even less, the procedure to do so will generally require that the dynamic range of the audio be severely limited. The noise resulting from lower bit sampling is masked as long as the sampled sound amplitude remains high.

Reducing sampling rate also reduces data. So does conversion of stereo to mono. This may appear to be

obvious, but it can be disheartening for the audio engineer to listen to the sound once it has been down-sampled, bit-reduced, and converted to mono.

Fortunately there are some alternatives which are beginning to make an impact on data-reduced audio in multimedia. Most of these are lossy compression algorithms based upon perceptual coding. [8] Although much research is being directed toward reduced bit rate perceptual coding schemes, there are several encoder/decoders (codecs) which are beginning to make their way into use for multimedia audio applications. Included among these systems are Dolby Laboratories' AC3 [9], Motion Picture Experts Group (MPEG) Audio Layer 1 and Layer 2 [10], [11], and The International Multimedia Association (IMA) Adaptive Delta Pulse Code Modulation (ADPCM) format for cross-platform compatibility. [12], [13]

Although each of these codecs can be compiled via software, the processing of the sound file is CPU intensive. Depending upon which algorithm is utilized, the heaviest processing may take place at the encode stage allowing decoded playback to occur fairly rapidly. Each of these codecs can achieve data reduction rates of anywhere from 4:1 to 22:1 depending upon the dynamic nature of the file to be coded and the algorithm employed. All of the codecs mentioned above are also being implemented in computing hardware to expedite the encode/decode process. As of this writing, however, hardware solutions to the use of codecs for multimedia audio are not widely implemented. The Intel Corporation has recently introduced a new pentium-based processor chip called MMX which allows the acceleration of codec operations. [14] In order for any hardware solution to have an effect on the use of perceptually-coded files for multimedia will require users to add to, or replace, existing hardware on their computing systems. A good indication of the potential for long term success of these file formats is that the manufacturers involved with each of the systems are continuing to do research on perceptual coding and are maintaining an open format for forward and backward compatibility with new development.

Problems in Aural Multimedia Utilization

Unfortunately for those who regard audio quality with high esteem, audio is generally the least significant element in many multimedia productions. Video, text, and graphic content usually take predominance when construction of multimedia is underway. All too often, the producer of audio elements for multimedia productions is left to work within severe constraints regarding disk space and memory utilization. Therefore, the audio on many finished multimedia projects becomes a caricature. Once imagined majestic themes are ported to General MIDI soundcards with their oft distinguishing trait of tinny FM synthesis. Dynamic, full bandwidth audio samples are compressed, re-sampled, and truncated to fit into ever smaller packages. In the end, there is sound. But the price paid besmears the quality overall. This situation has improved recently with advancements in lossy compression technology and parallel advancements in application of sampling technology to MIDI synthesis in the multimedia domain. Additionally, there have been extreme and rapid advancements in the hardware used to play multimedia applications.

File Formats

Perhaps one of the most daunting problems facing the author of multimedia presentations is the number of different audio file formats which exist. Needless to say, not all of these file types are compatible. As with text and graphic documents, some sound formats are proprietary to the platform on which they were developed. For the multimedia author, this presents a variety of problems including cross-platform viability.

Additionally, the sample rate of some formats are incompatible with those in other formats. For example, prior to Macintosh system 7, system sounds were encoded at 22.254 and 11.127 kHz rather than at the evenly divisible CD audio compact disc rates of 22.05 and 11.025 kHz. [15]

Regardless of format, however, most sound files are stored as raw pulse code modulation (PCM) data. What differs in many of these formats is file header information which tells the computing platform what type of data to expect. Additionally, files are stored differently on various platforms. For example, Macintosh platforms require a resource fork in addition to the data. Windows and UNIX systems, on the other hand, do not require this fork, but do require an extension in the file name.

Format Conversion
It is possible to perform sound file format conversions from one file type to another. Unfortunately many of these conversions produce audible artifacts. Occasionally these artifacts are extraneous data once used in header information and once converted are being played as audio. Given time and patience, these types of artifacts can be edited out. Quite often, however, it is more realistic to simply re-record the data on the other platform and save it in the required format.

Some format conversions require down-sampling to distill the data in the file. Unless proper noise shaping (anti-aliasing) and re-dithering are included in the transfer process, the resulting sound file will evidence extreme amounts of noise.

For the multimedia author, there are a number of useful format conversion tools available. Some products for sound format conversion such as Waves Waveconvert [16] and Turtle Beach Wave for Windows [17] are available commercially. Others, like Sound Hack [18] and Cool Edit [19] are shareware and are available for downloading via anonymous file transfer protocol (ftp). Brian's Sound Tool [20] is available for downloading as freeware. As is true with so many aspects of multimedia, it will pay to experiment with a variety of these products to determine which is going to give you the best results.

Batch conversion is extremely handy for sound file format conversion -- especially when all of the sounds for a multimedia title need to be converted from one platform format to another for cross platform compatibility. Some programs can convert any number of file formats in a single process and rename the files with proper extensions at the same time.

Some cross-platform compatibility can be obtained by simple renaming of files. However, in addition to renaming the file, say from an AIFF to a WAV file, it may also be necessary to eliminate a data fork. The process of integrating separate channel information in graphics applications and the process of interlacing separate data streams for audio and video in Quicktime movie applications is termed "flattening" . The flattening process can also be used to remove superfluous resource forks when conversions are being made for cross-platform playability. When importing files into the Macintosh and Power PC, a resource data fork may be added by utilizing the ResEdit [21] software utility. ResEdit prompts the user for an acknowledged data Type and data Creator for use with the data file. It helps to have previously examined properly-formatted files in ResEdit to determine what to place in the Type and Creator fields. If improper Types and Creators are associated with data files, a system crash may result when the file is accessed.

Software Incompatibility
For the author of a multimedia presentation, one of the more frustrating problems to encounter is the proprietary use of sound files within different authoring platforms. While one platform may make use of WAV files, another may allow only importation of AIFF files. On the Macintosh platform some authoring systems require the inclusion of sound files as resources (SND) to the presentation file itself.

When designing a multimedia presentation, a primary consideration is to determine at the outset the computing platform upon which the application will be authored. The decision here can have manifold effects including whether or not the application will play on other computing systems. Until recently, most authoring systems were designed to work only on the computing platform they were authored on. There has been a move, however, toward cross-platform compatibility with "players" which will allow playback of the multimedia presentation on other systems. Unfortunately, problems are still encountered. Quite often artifacts may occur when playback is attempted on another "non-native" platform. These artifacts may be observed in the graphics, video and in the sound. In order to alleviate the problems associated with format incompatibility, many projects are simply "re-authored" rather than "ported" to be played on another platform. This re-authoring generally requires the conversion of files used in the presentation to file formats utilized by the other system. It is here that batch file conversion software has made this process significantly less tedious.

Hardware Problems

Regardless of how much craft is expended in the sound design of a multimedia project, it will eventually be subjected to playback conditions that are far from optimal. The typical sound card installation in most PCs places audio output in extreme hazard. The inside of a computer is a high frequency RF factory with data busses, clocking circuits, etc. Many of these RF noises can find their way into the audio output of the sound card -- further tarnishing the sound even prior to amplification. Very few commercially-available sound cards expend much effort in shielding the card from stray RF and ground noises. The digital to analogue converters and operational amplifiers used in the circuits of many sound cards are compromises at best. Tests have indicated that the signal-to-noise ratio of a typical sound card may be as low as 63 dB and that frequency response at the analogue outputs of some sound cards may be as narrow as 300 to 15,000 Hz. [22], [23]. Sound card electronics and signal path are not the only problem. The jacks for input and output to the card are typically the 1/8th inch stereo "mini" plug. Contact is never very good and intermittent signals may result. Only a few sound card manufacturers produce a sound card that exhibits both full bandwidth and dynamic range capabilities of the 16-bit, 44.1 kHz. PCM digital audio signal at the analogue outputs.

Audio in Multimedia -- An Example

As most of these things begin, the initial impetus for this project began as an idea. A rather good idea, I thought. After teaching concepts of audio recording and production for many years, I thought that integrating a multimedia approach could lend some interesting classroom support. As it was, I was already drawing upon a number of resources in various media formats to help teach concepts in audio production. In class situations I was using video tapes, compact discs, cassette tapes, digital audio (DAT) tapes and, in some cases, even vinyl. Additionally I was also using a number of graphics -- some from various textbooks, many more which I had produced myself. Of course there was a fair amount of text. In traditional classroom situations this text was represented as spoken material, however, much of this was drawn from lecture notes. My idea was that if everything could be combined into a single platform of some type, I could be more effective in efforts to teach the material. But, it was the essence of the material which represented the problem -- the audio itself.

This situation was especially problematic when careful observation of timbre was necessary on the part of the student. Examination of timbre is elemental to the study of recording processes. Unfortunately, many of the currently implemented procedures to incorporate audio in multimedia presentations involve processes which rob the sound of distinguishing timbral characteristics. If it was my intention to produce a multimedia project which would be capable of demonstrating the quality of various microphones and various microphone techniques, then I was certainly facing a challenge. The planning process for this project would begin opposite where many other multimedia presentations begin -- with the audio being considered first.

The goal of this particular project was to produce a multimedia title which could serve as a training and educational tool based upon the sound quality it could transmit. Therefore, it would be most important that whatever technique was utilized to replay sound in the presentation that it be done with as much faithfulness to the original recordings as possible.

This was to be a multimedia presentation which would allow students to listen carefully to a number of different microphones and different microphone techniques in order to evaluate their relative merit with regard to timbre. It was also anticipated that others might use this presentation to determine which techniques and microphones to utilize in upcoming recording sessions. To further test the various sound qualities possible in a multimedia project, I wanted to design the presentation so that each soundfile might be playable in a variety of different soundfile formats and compression algorithms. This part of the presentation would be done for my own edification. Final versions of the project would contain only the soundfiles which I felt best represented the timbral quality of the original and which satisfied some minimum performance parameters.

Test Parameters

- The minimum performance parameters for this project would be as follows:
- The project should be able to play on either a Macintosh or a PC platform.

- The project should play on a platform with 8 MB of RAM, possibly even 4 MB.
- The delivery vehicle would be CD-ROM.
- Playback must be in stereo.
- Final sound file format should be as true to original as technically possible.
- The wait for playback of each sound file should be kept to a minimum in order to preserve acoustic "memory" of the previous selection.

Recording Procedure

Since this would be a study of timbre realization, I determined that the recording should be of a piano. For this recording a 5' studio grand was utilized. The process involved a simultaneous recording of a number of microphones placed in a variety of different microphone patterns. Keeping all limitations of multimedia technology in mind, it was determined that the reference piano recording should be short. But while short, should demonstrate as much of the subtle sonority of the instrument. Therefore, I had the musician play a strident chord, engage the sostenuto pedal and play a short descending arpegiated scale to a sustained tonic chord. This exercise would allow for good imaging in the stereo spectrum and would allow the listener to compare the timbral differences of both microphone and placement.

For this demonstration, the outputs of 12 pairs of microphones were fed to the microphone preamp inputs of a recording console for level balance and then bussed directly to the analogue inputs of a 24-track digital tape machine. Included among the stereo microphone configurations utilized were coincident pair, near coincident, mid-side, and spaced pair. The pairs were situated for close field, mid field and far field pick up in a 1600 square foot recording studio. In order to produce two-channel matrixed stereo outputs, only the mid-side combinations utilized console electronics other than the microphone preamp. Once the selection was recorded, each stereo pair of tracks was output via digital AES/EBU bus to a DAT machine.

Test File Formats

To produce audio segments for the multimedia presentation five computing platforms were utilized. A Macintosh IIci equipped with Digidesign Sound Designer and ProTools software was used to create edited Sound Designer (SNDII) format files. This platform was also used to convert the SNDII format files to AIFF files at various bit rates and sampling frequencies. A Silicon Graphics Indigo 2 was used to create edited 16-bit AIFF files from which other format files could be produced including MPEG Layer 1, AU, and Audio Interchange File-Compressed AIFC format files. A Gateway PC was utilized to create edited WAV format files and to produce conversions to ADPCM WAV files. A Macintosh Power PC equipped with Macromedia Sound Edit 16 was used to create Macintosh Audio Compression/Expansion (MACE) files and QuickTime/IMA ADPCM audio files. Another Power PC equipped with a gigabyte hard disc and a CD-ROM recorder was used to create mixed-mode CDs. All audio was transferred digitally -- either via AES/EBU or SCSI.

This procedure may serve to indicate yet another problem when attempting to produce audio for multimedia -- the need to have many computing resources at hand. This particular project could have been accomplished with much less equipment, but not with the same efficacy and speed.

All of these files were edited to length and saved or converted to the following formats:
Format
Chan-nels
Sample Frequency
Bit Depth
Length
Resulting File Size
(bytes)

* Sample frequency and bit depth prior to compression

In order to create reduced bit files, a number of conversion steps were required. Some of the application programs employed would perform format conversion automatically, but whether performed automatically or manually, the best results occurred when the following steps were followed:

(Import the full bandwidth file via AES/EBU or SCSI.

(Normalize (not compress) the file so that amplitudes are at highest bit order.

(Filter (low pass anti-alias) the file just below Nyquist point for destination sample rate (i.e. files to be downsampled to 22.05 kHz were filtered with the low pass set at 10 kHz.).

(Convert sampling frequency (i.e. 44.1 kHz to 22.05 kHz).

-- And/Or --

(Re-dither (i.e. 16-bit to 8-bit).

Listening Test

Following format conversion each file was listened to in all of the final sound formats created. Although reduction of data through compression or bit/sample rate reduction would have been fine for many applications, none of the compressed file formats compared favorably enough with the original full bandwidth 16-bit samples to be considered for a critical listening evaluation. The truncated bit files were eliminated for use in the project due to noise problems associated with the dynamic nature of the original sound file. Reduced sample rate files were eliminated from consideration due to the loss of timbral characteristic resulting from low pass filtering. The MPEG 1 layer 2 lossy-compressed files compared very favorably to the original files, but not on all platforms. Since the performance of the same file varied from platform to platform, the decoding algorithm (shareware) and the software compatibility with the hardware employed was probably at fault. Additionally, on all platforms with the exception of the Silicon Graphics, the MPEG file launched decoding software. In one case, the file decoding process took 20 minutes. The IMA ADPCM Quicktime and ADPCM WAV compressed files proved to be quite good for casual listening over multimedia-style loudspeakers. However, both formats evidenced problems with dynamic response characteristics and exhibited noise at lower amplitude levels. These artifacts were especially noticeable on a good quality monitoring system and with headphones.

The No-Compromise Approach

In the end, it was decided to author the project as a mixed-mode CD. Since the project would be authored to CD-ROM regardless, and since the disc would be capable of storing upward of 650 Mbytes, all of the data for this project would fit easily on a single disc. Therefore, the key would be to transfer the original sound files in 16-bit 44.1 kHz format to the CD-ROM in such a way that little time would be lost each time a file was accessed. To do this, all of the files which are accessed regularly including data files would be written to the disc first so that these files would be on the innermost tracks of the disc. This way, the laser can read them much faster and a much shorter wait occurs. All of the audio files followed as separate files in Red Book audio format. It was important to realize, in the authoring stage, that little else should be happening while audio was playing off the drive. Since the project would play entirely from the CD-ROM, users with little RAM (less than 8 MB) would experience interruptions as the disc began to stream audio off the CD. In constructing the CD with Red Book Audio tracks separated following the data, the only wait experienced would be the normal delay as the laser moved from track to track on the disc. This solution also proved to solve some of the problems associated with cross-platform compatibility. In the CD recording process, all of the file names followed the ISO 9660 convention (eight characters with an extension) so that the disc could be read on either Macintosh or PC platform.

Conclusion

The use of multimedia is rapidly expanding and the tools with which it is constructed are continuing to improve. As is so true with the integration of new technologies, those who are early adopters often run into frustrating circumstances. However, it is the resolution of these frustrations which advances the art of the technology. The use of sound in multimedia will no doubt improve. As discussed, many new and innovative uses of technology are being applied to digital audio recording and its potential for use in multimedia.

References:

[1] More Than Music, Rock 'n' ROM / The Track 1 Problem, Don Menn, Multimedia World, August, 1995, pp. 65, 67

[2] Mastering CD-ROM Technology, John Wiley & Sons, Inc., Larry Boden, 1995, pg. 65

[3] The Allen Sides Microphone Cabinet, Cardinal Business Media, Inc., 1995., Music and Entertainment Group, 6400 Hollis Street,
Suite 12, Emeryville, CA 94608

[4] Control, Light Rail Communications, Inc., 625 Second Street, #410, San Francisco, CA 94017

[5] Multimedia PC Level 1 Specification, Multimedia PC Marketing Council, 1730 M Street NW, Suite 707, Washington D.C. 20036

[6] Multimedia PC Level 2 Specification, Multimedia PC Marketing Council, 1730 M Street NW, Suite 707, Washington D.C. 20036

[7] An Overview of Audio Technology for the Multimedia Personal Computer, Jim Heckroth, presented at the 97th Convention of the Audio
Engineering Society, 1994, pre-print 3875

[8] Signal Compression Based on Models of Human Perception, Nikil Jayant, James Johnston, Robert Safranek, Proceedings of the
IEEE October, 1993, Volume 81, Number 10, pp. 1385 - 1421

[9] AC-3 Operation, Bitstream Syntax, and Features, Mark F. Davis and Craig C. Todd, presented at the 97th Convention of the Audio
Engineering Society, 1994, pre-print 3910

[10] Overview of MPEG Audio: Current and Future Standards for Low Bit-Rate Audio Coding, Karlheinz Brandenburg and Marina Bosi,
presented at the 99th Convention of the Audio Engineering Society, 1995, pre-print 4130

[11] The ISO/MPEG Audio Coding Standard, Leon M. Van de Kerkhof, Aldo G. Cugnini, Widescreen Review, June/July, 1994, pp. 58 -
61

[12] IMA ADPCM Recommended Minimum Capabilities of a Compliant Platform, 1995, Interactive Multimedia Association,
http:// www.ima.org

[13] IMA Recommended Practices for Enhancing Digital Audio Portability (Revision 3.0 - 10/21/92), 1995, Interactive Multimedia
Association, http:// www.ima.org/

[14] How MMX Technology Works, John Clyman and Nick Stam, PC Magazine, February 4, 1997, p 104

[15] CD-ROMs Should Sound as Good as They Look, Bob Currier, Computer Video, September/October, 1995, pg. 22

[16] Waves, 4302 Papermill Road, Knoxville, TN 37909 USA http://www.usit.net/waves

[17] Turtle Beach Systems, http://www.tbeach.com/products/wave.htm

[18] Sound Hack, ftp://music.calarts.edu/pub/SoundHack/SH0868.hqx

[19] Cool Edit, Syntrillium Software Corporation, http://www.netzone.com/syntrillium

[20] Brian's Sound Tools, ftp://src.doc.ic.ac.uk/packages/info-mac/gst/snd/brians-sound-tool-13.hqx

[21] ResEdit ver. 2.1.3, Sumit Bando and Samiran Basak, 1984 - 1994, Apple Computers, Inc.

[22] An Earful of Sound Boards, John R. Quain, PC Magazine, March 28, 1995, pp. 167 - 190

[23] Sound Cards -- Audio Performance Spec Tests, Michael Marans, Keyboard Magazine, October, 1994, pp. 49 - 53

[TOP]